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The INDUSTRIAL-ARTS MAGAZINE

JULY 1925

The Bruce Publishing Company
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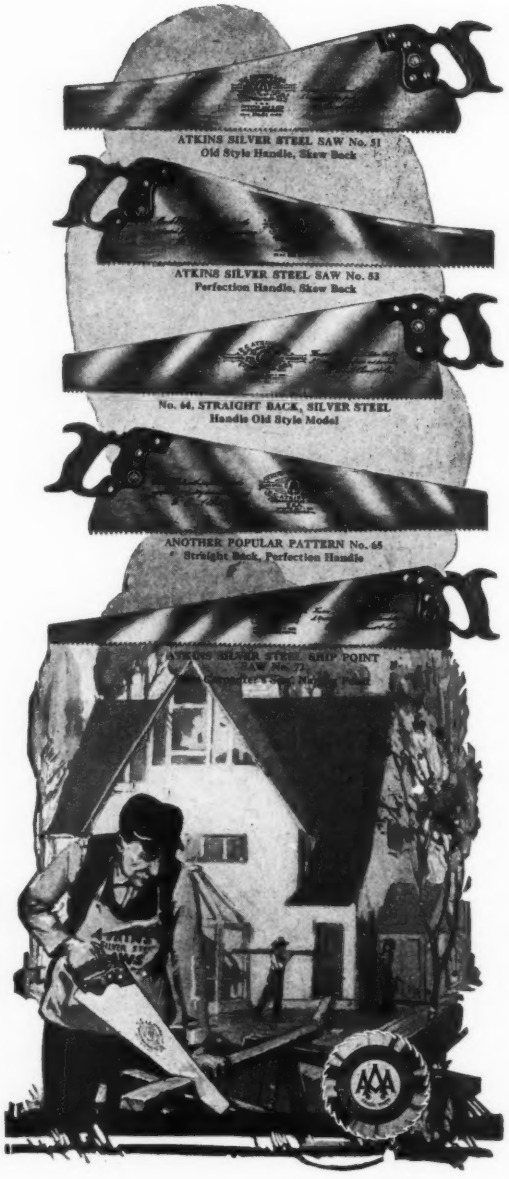
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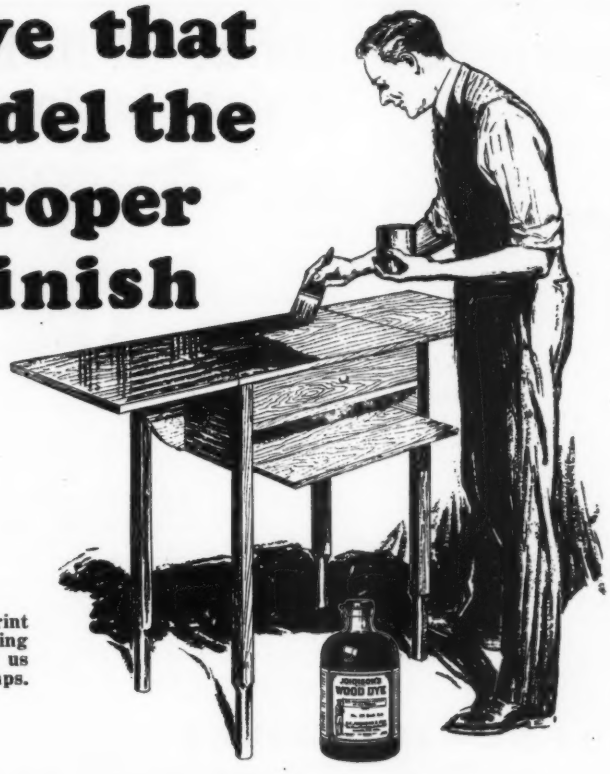

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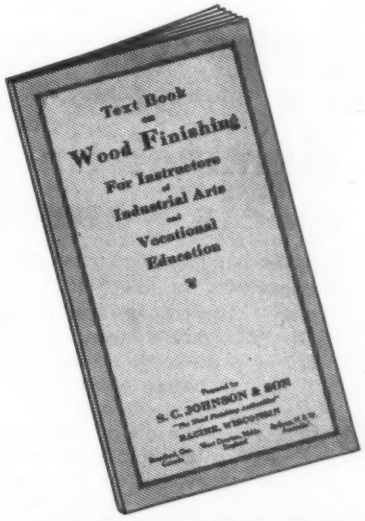

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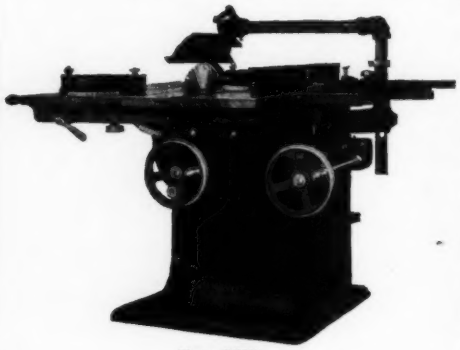

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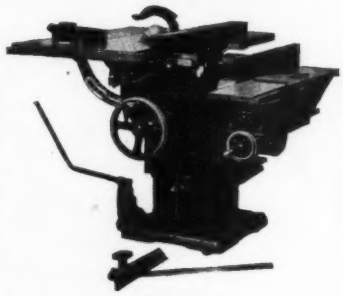

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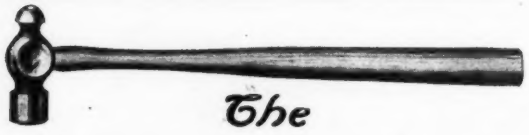

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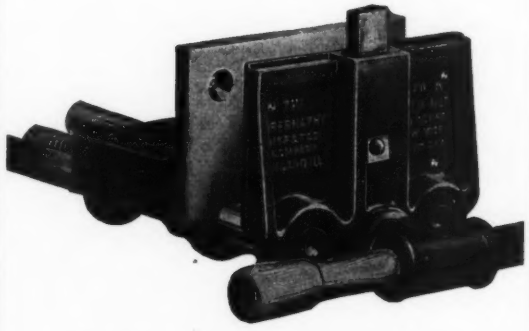

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Vol. XIV
No. 7

INDUSTRIAL-ARTS MAGAZINE

July,
1925

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VACATION

A WOOD shop teacher tells us that he will spend the summer building a house for his family. A machine shop instructor writes that he will put in two months in a small shop where he will come into contact with a great deal of repair work. A sheet-metal teacher says that he will be "straw boss" on a big construction job. Another teacher tells us he is to manage a boys' camp. Still another will work at a university for his master's degree. And so we might enumerate a page of plans for vacation, which serious professional industrial arts and vocational men have planned as a means of making the summer profitable and pleasant. In every one of their remarks we find the quiet determination to go back to school in September revived, refreshed, and ready for better teaching service.

Perhaps we have come in contact with exceptional men from among all the thousands of shop teachers. We think not. Experience of past years indicates that a greater percentage of shop teachers use the summer vacation to their professional advancement than any other type of teachers.

What a vast improvement there would be in all branches of educational service if every teacher made a genuine effort at self-improvement during the summer months!

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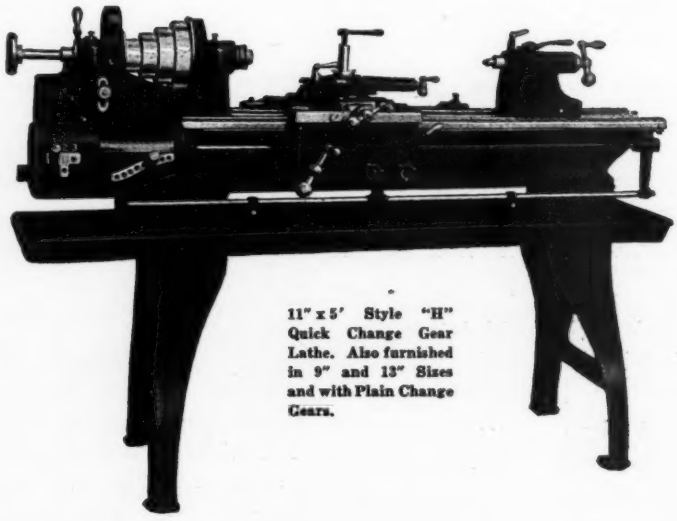

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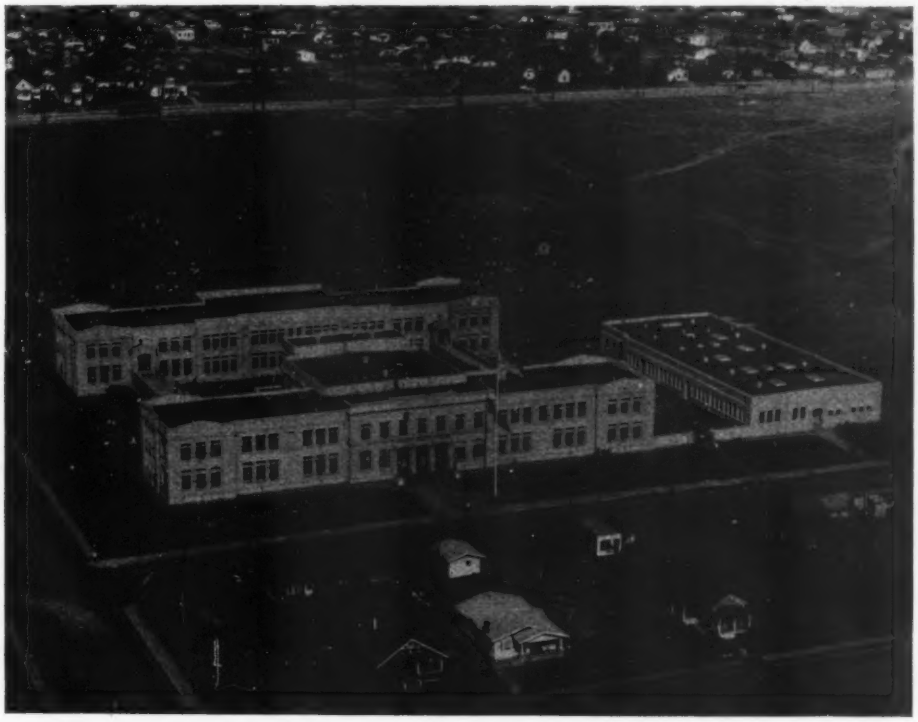


VIEW OF THE MEMORIAL JUNIOR HIGH SCHOOL FROM THE AIR. INDUSTRIAL ARTS DEPARTMENT OCCUPIES THE BUILDING ON THE RIGHT.

Industrial Education in San Diego, California

P. H. Heron, Supervisor of Industrial Education

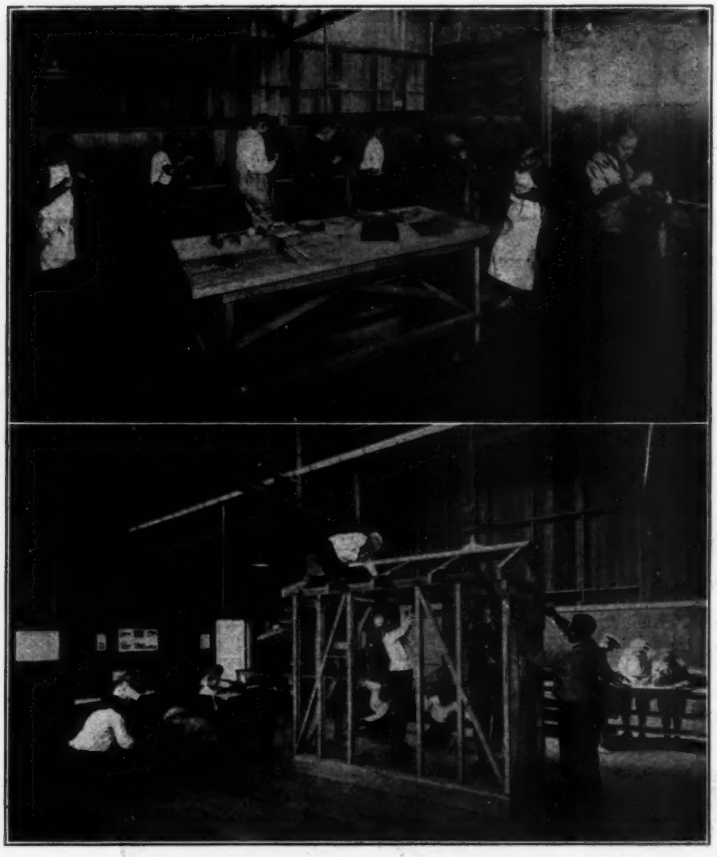
SAN DIEGO is a city of over a hundred thousand population. It covers an area of 150 square miles, extending from Del Mar, a distance of 25 miles north of the business center, to National City Limits, five miles south. The eastern and western boundaries are about seven miles apart. The school population is approximately 25,000. San Diego is not an old manufacturing city, although it has a number of manufacturing plants that make a variety of products. If the population and interests continue to develop in the next few years as they have in the past, San Diego will grow into an industrial city, with a cosmopolitan population and with many important manufacturing interests. Far-sighted citizens in the community, feeling that the city will become a large manufacturing city and seaport, have felt the necessity of certain types of education other than the traditional college-preparatory type. The result has been the adoption of a comprehensive program of industrial and trade education.

The school population is housed in 27 elementary schools, one four-year high school, one six-year high school and two junior high schools. There is now under construction to be ready in the fall of 1925, an additional junior high school, one six-year high school, and one elementary school.

Elementary Schools

In reading current magazines and books on child life, there is a tendency to hark back to the time when many forms of handiwork were carried on in the home. We hear that changed environment has made living conditions today so complicated, and trade activities so specialized, that the home does not offer the opportunity for industrial knowledge that it did in times past; therefore, the growing boy of today loses something in his mental and physical development that the boy of another age received.

In San Diego, where a home has at least a yard and a fair sized garage, and where the open spaces are not far away, the average boy of the fourth, fifth and sixth grades may do a great deal of handwork in relation to his home activities, by making articles connected with



TOP—SHOE REPAIRING CLASS AT THE MEMORIAL JUNIOR HIGH SCHOOL, SAN DIEGO, CALIF.
BOTTOM—ELECTRICAL SHOP AT THE ROOSEVELT JUNIOR HIGH SCHOOL, SAN DIEGO, CALIF.

his play and home chores, and so have an opportunity as great and, in some cases greater, than the boy of the same age in times past. With his home environment, the help of the elementary school shops, and an understanding teacher, he has the opportunity to express his desires with tools and materials.

Using the boy's desires as a guide, our course in elementary shop work is worked out on the following lines. Trying a boy's interest with the shop work, the teacher has the student choose to make such things as mechanical toys, boxes, birdhouses, radio sets, stilts, coasters. From the boy's desire to make these articles, certain general information is given to the boy, such as the necessity of planning his work, the importance of accuracy, the value of good tools, the importance of "a place for everything and everything in its place," the names and uses of the tools he uses. Through the elementary shop work, a certain amount of tool information is given in regard to the tools he uses; and because of their experience in the elementary shops, skill of a certain degree is obtained.

Personally, the writer believes that a great deal of our elementary shop work should be given in the junior high school, as he believes that with large plants and the opportunity for so many kinds of shop instruction, the average boy can wait another year before he takes up formal shop instruction. From a monetary standpoint, this would save a city like San Diego many thousands of dollars every year and still give the boy an opportunity to get the shop training that will be of value to him before he leaves the guidance of the school. In California this is especially true, because every boy and girl must attend school until 16 years of age and attend part-time school until 18, unless graduated from a high school.

Junior High Schools

The junior high school should be primarily a guidance school, as it is the period of adolescence, the period of shifting interests and ambitions. The child begins to try himself out, to experiment, to test his ability in doing things for himself. He is fickle, changeable, and does "everything by starts and nothing long." San Diego has two splendid junior high schools. Superintendent H. C. Johnson picked the teachers to study the proposed junior high school curricula two years before the schools were finished. The course of study for the junior high schools was given a great deal of thought and is still in a period of development; it is being redeveloped and made over as the needs of the boy require. I believe the junior high school programs of industrial education will change materially during the next few years as, in spite of studying the course and the equipment, there is a tendency on the part of teachers to re-enact to previous environment.

A senior high school teacher, unless he is especially trained for junior high school work, will bring the senior high school attitude into the junior high school shop, and the elementary shop teacher will carry along the elementary shop view. There is also the danger that, in our enthusiasm for industrial education, and unhampered by the use of public money, we may be too generous with floor space and too lavish with equipment. The important needs of the junior high school today are properly qualified teachers and a better understanding of the problem of the junior high school. In making this statement about junior high schools, the writer does so after visiting a number of junior high schools where a "small edition" of the traditional four-year high schools were labeled junior high schools. San Diego has not been innocent of the same charge, but we are rapidly endeavoring to bring the real junior high school idea into the junior high schools. With a guidance program as our goal, it is our aim to provide equal opportunity for every child, taking into consideration his individual abilities and aptitudes. The ultimate aims of industrial subjects in the San Diego junior high schools are those common to all education.

The industrial arts departments of the junior high schools offer a three-year industrial arts course for boys interested in shop work as a part of their general prevocational education. The purpose of the work in the seventh and eighth grades is to give every individual boy contact with as wide a number of shop trades as possible, in order that he may find out what he likes best and that for which he is best fitted. To the boy who is not going into any industrial line, this affords

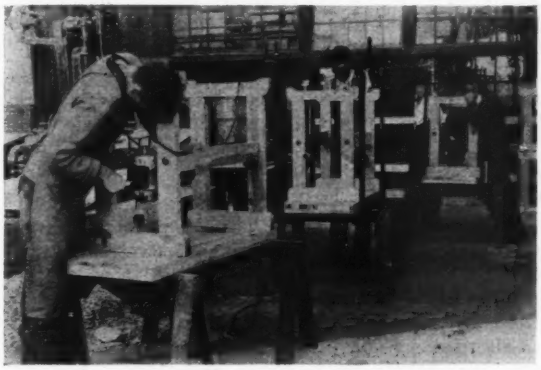
an insight and develops an appreciation of these trades. In his last year in the junior high school he can concentrate upon the one of his choice.

In the seventh grade, shop work is required of all boys for five hours per week. The semester is broken up into three units, one of these to be spent in fine arts, one in mechanical drawing, and one in general mechanics or home mechanics.

In the eighth grade, shop work is required for five hours per week of all boys in the industrial arts and engineering preparatory courses. Boys in other courses may elect it. In the eighth grade, they are allowed a choice of applied electricity, printing, woodwork, sheet metal, radio, shoe repairing and automobile work. In this grade, they are allowed a choice of any shop work not previously taken.

In the ninth grade, shop work is required of all boys in the industrial arts course for ten hours per week. Others may elect five hours. Five of the ten hours per week are spent in mechanical drawing, the other five being shop work of their choice.

The work in the junior high schools along industrial lines has been organized and selected so as to offer instruction in a large occupational or trade selec-



STUDENTS ASSEMBLING THE BENCHES, SAN DIEGO HIGH SCHOOL, SAN DIEGO, CALIF.

tion. In this way the junior high schools offer desirable practical experience with real vocational guidance significance.

Senior High School Industrial Work

At the present time, San Diego has two senior high schools, and another will open in September. In writing of the senior high school shop instruction, I refer to the San Diego senior high school, as the work in this school has been established a longer period and offers more subjects than the La Jolla high school. The shop subjects offered in the San Diego high school are automobile construction and repair, carpentry, cabinet-making, machinist trade, forge work, printing, radio, electricity, acetylene welding, mechanical and architectural drawing. The above are offered both as general and trade opportunity courses.

During the past year, San Diego constructed over $16,000,000 worth of property. Most of the building work done was that of small houses, demanding a great many carpenters. To provide training for boys of the city who want to become carpenters, a course in trade carpentry was started in September, 1923. One-half of the day of these students is spent working on actual construction work and the other half is spent on related subjects. The course covers a period of two years and is open to boys 14 years of age, mechanically inclined.

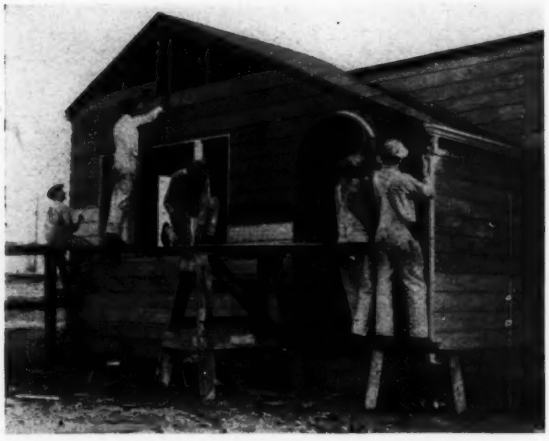
MACHINE SHOP, SAN DIEGO HIGH SCHOOL, SAN DIEGO, CALIF.

Other students irrespective of their place in the school system, have been allowed to enter the class as they have also the other trade courses. The illustrations show some of the practical work of the class, done during the past year. The trade work in carpentry has all been given on the job as we have been fortunate in getting work outside the school plant.

The automobile courses are designed to meet the needs of two classes: First for the young man who expects to enter that vocation, and second, to familiarize the ordinary mechanically-inclined student with the fundamental principles of the trade. Automobile men, especially shop superintendents urge that, while in school, students who expect to become automobile mechanics be given very basic training. If proper attitudes are cultivated, young men in the trade will be able to progress in their vocation, open-minded to suggestions, and with the ability to profit with each added year of practical experience. The large majority of automobile-owners today would be able to save over fifty per cent of their operation expenses, if they understood the fundamental principles of the machine from which they derive so much pleasure. The automobile course in the San Diego high school covers a period of two years and is designed to meet the needs of these two groups.

The six-semester electrical course, in the San Diego high school, is based on a two-semester try-out course in the junior high schools. To avoid confusion, the entire eight semesters of the electrical shop are numbered in sequence, and after the first high school semester, the work must be taken progressively.

PRINT SHOP, SAN DIEGO HIGH SCHOOL, SAN DIEGO, CALIF.



TRADE CARPENTRY STUDENTS AT WORK. BUILDING STARTED IN SEPTEMBER, 1924, READY FEBRUARY, 1925.

This course is taken by two classes of students—those who will enter some engineering school after graduation, and those who must find a job and settle down to work. In each unit of the three-year high school course, theoretical work is combined with actual shop work in the proportions that experience has shown to be most practical. The courses have been approved by leaders in the electrical business in the city.

The beginners may have had a year, or only a semester, of electrical work in the junior high schools, or may perhaps have never had any such work. They all start in together in the fundamentals of electricity and magnetism, working problems involving the application of Ohm's law, reading electric meters and calculating bills, making approved joints and splices, laying out and operating simple wiring circuits, studying the construction and care of storage batteries, and leading up to the fundamentals of electrical generators. Naturally the work is more difficult for those without previous electrical experience. Anyone desiring to study high school radio must have this semester of electric shop work as a pre-requisite.

The second semester (Electric Shop 4) is given over entirely to interior wiring. Forty-eight wiring circuits are first laid out on paper and then made up of actual material on portable boards. All these circuits are tested under actual service conditions—usually with 110 volts. Later in the semester, actual permanent wiring is done with rigid iron conduit, flexible steel conduit and metal molding. This work is subject to inspection by the city electrician and must meet all legal requirements. Each job in the semester must be written up on a prescribed form, showing tools and material used, operations performed, references looked up, and if possible, an illustrative diagram or sketch made. Boys who finish electric shop 3 and 4 with a high grade are recommended to the trade as first class "wiremen's helpers."

Electric Shop 5 and 6 are devoted exclusively to generators and motors, both D. C. and A. C. Fundamental principles are studied first. Actual machines are tested and repaired—rewound or rebuilt if necessary, and are then operated under all possible service conditions. The senior high school electric shop is equipped with a large motor-generator set, two D. C. motors (or generators), two synchronous alternators, and the necessary switches, starting boxes and rheostats to give complete control over them. Each student is expected to trace out all windings and check up on all connections of the machines, and ample opportunity is given each one to operate the machines until thoroughly familiar with them. A boy who finishes the prescribed work in these two semesters with good grades is rated as a first class helper in an armature winding shop.

The equipment for the last year's work includes three 5-KVA transformers, several instrument and current transformers, a switchboard five by fourteen feet in size (designed and built in the school shop) and carrying seven ammeters (some with shunts), five voltmeters, two wattmeters, a synchronism indicator, a power-factor indicator and the necessary jumpers and switches to connect any instrument to any load. In addition to the switchboard instruments there are portable instruments, such as ammeters, voltmeters, wattmeters, a Wheatstone bridge and a pyrometer. As indicated by the equipment list, the advanced students bank and operate transformers, build and operate switchboards, and test all kinds of electrical machines. When a job is assigned to them, they are expected to seek out all necessary technical information, conduct any required test, make any repairs or adjustments, and report fully in writing. Some jobs may require ten minutes of theoretical work and a week of shop work, while the next job may be just the opposite. But throughout the entire course, there is only one test of accomplishment "Does it *work?*"

And now, what about the results achieved by the course? Anyone finishing the course will have a workable foundation upon which to build for an electrical engineering degree. Anyone finishing the course will be able to get some kind of an electrical job with resultant higher pay or at least easier work.

After one year of electrical shop work, fifteen per cent of one class entered permanent electrical work; during their second year, twenty per cent of another class worked in down-town electrical shops after school and Saturdays, while forty per cent of the same class had electrical jobs during their summer vacation. These same boys complete the course in June, 1925. Over one-

A PROBLEM ON THE MILLING MACHINE, SAN DIEGO HIGH SCHOOL, SAN DIEGO, CALIF.

BUILDINGS ERECTED BY CARPENTRY CLASSES OF THE SAN DIEGO HIGH SCHOOL.

half of them have been assured permanent positions and another thirty per cent expect to go on to college. The course is worth while if these boys never become electricians, for they will carry with them a broad, general knowledge of electrical appliances of benefit to them all through life, since no trade or profession can say it is independent of electricity and needs to know nothing about it.

Printing in the San Diego Schools

Printing, the latest of the industrial arts to be added to the curriculum of the schools, has fully justified itself in San Diego during the past few years. Since the opening of the junior high schools in September, 1922, nearly 600 pupils in the ninth grade have been enrolled in this department and many of them have continued this work after they have gone on to the senior high school. At present the two junior high schools each give instruction in printing to 125 pupils daily, while at the senior high school, 130 are enrolled in the day classes and 30 in the evening school.

A progressive course has been adopted, beginning in the junior high schools with the principles of type setting and press feeding during the first semester, and advancing to elementary job printing as the work continues in the second semester. The medium of instruction consists of "live" projects such as personal, class and school printing and school papers and magazines.

Due to radical changes in the method of presentation, the student who finds himself at the completion of the "try-out" course in the junior high schools, may continue in this line of work in the senior high school without loss of time. The student who is seriously minded regarding the choice of a vocation, finds trade classes open to him in any one of three branches of the printing industry, viz: linotyping, job printing, or newspaper advertisement composition. The projects used in these courses are similar but somewhat more complicated than those employed in the junior high schools.

In the practical application of teaching methods employed in the high school, one very interesting and unlooked for phase of the work has presented itself. This has to do with a certain group of students, who are ambitious to become writers and are demanding instruction in printing which will be of assistance to them in their chosen field. Students in this group are assigned to special work in proof-reading, type-setting, estimating, setting heads, and newspaper and magazine page lay-outs. A small handbook of newspaper style has been compiled for their especial benefit.

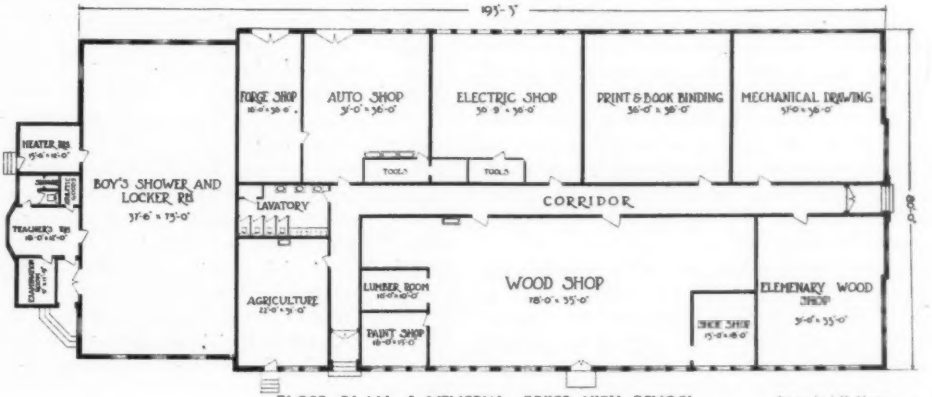
Other groups of students who wish to specialize in any one particular branch of the printing business are classified as "specials" in presswork, linotyping or advertisement compositor.

While much work both pleasing and gratifying from a mechanical standpoint has been accomplished, the resultant increase in school spirit and correlation with other departments of the school has also been a source of satisfaction and inspiration to the instructors of printing.

Evening High School

In the San Diego high school and throughout the city, wherever a group of people wish instruction, evening work is offered in any subject. Last year, the enrollment was over three thousand.

From this brief description of industrial education in San Diego, one can agree with Henry C. Johnson, superintendent of schools, when he says "The schools are attempting to bring the public to realize that education no longer consists alone of books and recitations, important as these are, but includes all that relates to community and national action."



FLOOR PLAN of MEMORIAL JUNIOR HIGH SCHOOL
SAN DIEGO, CALIFORNIA
(SHOP BUILDING)

Drawn by L Muehlessen
Arch Drawing Student, SDHS

Pioneers of Today

Laurence Parker, Kansas State Teachers' College

CAN you see the pioneer of olden times, in his covered wagon, driving up to the site of his future home upon our frontier? Can you see him sitting there, looking down upon the rolling country stretching away to a stream, and then up and on again to disappear over the hills in the distance?

"Here," he says, "shall be our future home. Here our children and grandchildren shall live, surrounded by plenty—plenty of land, plenty of cattle, and later plenty of money." He dreams that right here where the wagon stands will be the farm-house, with room and to spare for all of the children and grandchildren of the old-fashioned family of the times. Eventually this was the sort of farm home that he would build on this site.

The pioneer of that day was too practical to attempt to make such a worthy dream a reality at that time. It was often late in the fall when he found the place he wished for his own. The only safe plan was to build a one-room log or sod cabin to protect his family from the winter winds soon to sweep down from the hills. Often the race with winter was a close one and scarcely won by the settlers.

Suppose that as the pioneer sat upon his wagon seat he had said to himself: "A one-room cabin is too cramped for a family of our tastes, our inclinations and temperament. My wife came from a comfortable farm-house back east, and I too was brought up in a large house. I will get out the logs for a four-room house before I attempt to build at all."

That would have been a very fine ambition, but it would have resulted in the freezing to death of the little family huddled in the covered wagon, getting no protection at all from the pile of snow covered logs which would have been more than enough for a snug one-room cabin.

"But pioneer days are over," you say, "Why are we going back in memory to the days of covered wagons and one-room log cabins?" It is true that our geographical frontier has almost disappeared, but we have another frontier left with us that covers more territory than the old one ever did. It is the economic frontier with which we all have to reckon today.

Every year millions of boys and girls leave grade and high school and go, as pioneers, out upon our economic frontier. They will get advice and a little help from those already there but they must settle their frontier problems for themselves. A few of them have been making little summer trips to the frontier while in school. They are the ones who have been working in summer vacations. Some have been actually living on the frontier and commuting back and forth to school. They are the boys and girls who are working their way through school. These boys and girls are often pitied by the other children and by the parents, but they are really the fortunate ones. They are getting the logs cut and starting their cabins on that frontier, and they are learning how to cope with the storms and dangers of that economic frontier.

All of these millions of boys and girls have a living to make, and have to get a start in life at the close of school days. I like to think of them at the close of their school days, as pioneers on the seat of the covered wagon, dreaming and planning of what they shall do. Lucky are they if they have the skill with the axe that enables them to get out quickly the logs they need for a good snug cabin, a start toward their ultimate goal in life. This cabin is a comfortable trade or occupation which will enable them to earn and to save. The skill with the axe is a knowledge of all the fundamentals underlying that trade and as much practice in the actual skill of the trade as is possible.

Perhaps training for a one-room log cabin sort of trade or occupation seems a narrow and cramping sort of education to be given in a schoolhouse. Perhaps you feel that the boy and the girl should know and appreciate art, music, the history of the race, biology and all the sciences, as well as the best that has been written in prose and poetry. In the language of the comparison, "Never mind the skill in getting out the logs. He should not be satisfied with a little one-room log cabin. Lets help him to appreciate and attempt a farmhouse in which he and his descendents can take comfort."

The results of this argument are all about us. In the commercial departments of our high schools we are so busy giving broad education to the boys and girls that those who really need the one-room cabin in the minimum time go out to the business college, and pay for the skill with the axe that they so desperately need. In New York City alone, it is said four men became millionaires in a few years from the operation of business colleges. There was no reason why these millions should have been paid out to them, for the public school should have provided the same sort of training for them in return for the school taxes paid by their parents.

Less than ten per cent of our people work in the professions or other occupations for which a college education is necessary preparation. This means that college training is necessary for ten per cent of our boys and girls if they are to have the right training to build their homes on the frontier. They are getting that training and they should have even better than they are getting. Every aid should be given them to reach that skill which will help them to build their structure.

But what about the other ninety per cent of the boys and girls? They have found that the schools, from the first grade to the end of high school, are planned and operated to take care of the other ten per cent. They are welcome to as much of this instruction as they can absorb or can afford to spend the time to absorb. They may stop then and go out quietly upon the economic frontier to build their cabin and get into it before the blasts of winter sweep down upon them. To their amazement they find that they have not been taught to build what they so sadly need and, if it were not for neighbors, friends, relatives, and employers who help them, they would be a long time in getting a shelter that will house them.

Why do not the schools teach the skill with the axe that these boys and girls so sadly need? It is only in recent years that schools have been called upon to do this, and some are attempting to do it in a limited way through vocational schools and classes. Others argue about it and say it is not their jobs. Still others declare that boys and girls are too precious and their time is too precious to spend at "axe work."

It is true that this "axe work" for the ninety per cent of the boys and girls was taught in the home and the factory of olden times. It is also true that the schools must teach much of it now if it is to be learned.

To continue to use our figure of speech it requires a higher degree of "axe work" than ever before. Then too, the boys and girls of today are almost sure to choose an occupation different from that of the father or other relatives. They must get their training from others who have themselves to look out for if the public school does not do the training. It is also true that the school tax money of parents of the ninety per cent are used for the furnishing of a sort of axe work which does not help these children with their cabin.

This condition of affairs affects over ninety million of our people directly and so is an important matter. It also affects the other ten per cent of the people, for a handicap of one affects all. Every man and woman who pays taxes helps to support poorhouses and county hospitals. The greater proportion of the inmates of such institutions are folks who had no trade and who drifted into poverty from casual labor.

Does the one-room-cabin trade pay? It pays dividends almost from the start. To begin with, the boy or girl with a one-room cabin trade well learned, can start to save $15 a month from the time they are 18. If they never save a cent more per month than that, and use building-and-loan accounts, or similar investments, they will have over $25,000 yielding $125 per month when they are 65 years old. This means that they need never worry about old age and the old folks' home.

On the other hand, the boy or girl who comes out of school without the right sort of skill to get that cabin built is delayed in starting to save. He is sure to get married about the time the cabin is well started and he is lucky if he commences saving his $15 a month when he is 30 years old. When he is 65 years old he has only $10,000 which will yield only $50 a month at six per cent. This means that he will have to hustle almost as hard after that time in life as before.

It has been the history of civilization that when bread-and-butter worries were eased, men began to enjoy the arts, sciences, and literature. The man with the snug one-room trade, if he be the right sort, will seek out for himself, through evening schools, libraries, and museums the best that has been thought and done in the world in other lines than that which earns for him his bread and butter.

Let us then, train the youth of the land to build the one-room log cabin trade. Show him how he may later add other rooms to it, but be sure that he can make the cabin snug and tight in the very shortest time before the blasts of winter sweep down upon him on the rugged economic frontier.

Industrial and Fine Arts Work in Europe

Arthur F. Hopper, Plainfield, N. J.

The conclusions drawn in this article are the result of a visit abroad and a study of school systems in various cities which included Paris, Strassburg, Kiehl, Zurich, Winterthur, London, Manchester, Liverpool, Dartford, and a number of other places off the beaten track.

Just as war changes the economic, social, and political schemes and plans of a country, so it changes educational policies. We see a result of this in our own country where we have placed as one of the direct outcomes of the draft system, a very definite stress on physical education.

England, France, and Germany have likewise made many significant changes. The educational policies of Switzerland, however, have not undergone much change, due to the fact that she was one of the few countries not materially affected by the World War.

Industrial and Fine Arts Education in Switzerland

This country presents a striking example of a small nation holding a creditable place in the economic struggle with larger and more powerful nations. Undoubtedly, Switzerland's success can be traced to two things—first, the natural beauties of the country which attract tourists from all parts of the world, and, second, to her educational policies which, while less liberal in some respects and somewhat undemocratic as compared with ours, are nevertheless very sound and progressive.

Perhaps it is in the field of applied arts that the Swiss have won their greatest success. It has been said that in this particular branch of education the Swiss have drawn from the French gracefulness and freedom of expression, from the Germans, technical excellence and thoroughness, and from Austrian and Hungarian sources, stimulus towards new motives and ideas. A visit to their schools fully justifies this statement.

All the work is strongly backed by government grants and supervision. The success of the applied art schools is in no small measure due to the fact that many of the teachers are accomplished designers and artists.

One of the striking features of the administration is the strong contact maintained with industry. Each school has an advisory committee, consisting of artists, manufacturers and master craftsmen, all of whom give unsparingly of their time in order that the particular school with which they are associated may maintain a high degree of efficiency. Another interesting feature is the fine museums attached to the schools in which are kept historic examples and modern art from all parts of the world.

Such schools and opportunities are in strong contrast to the lack of facilities in our schools, where gifted children after graduating from the grammar school drift into high school commercial and classical courses, where they find little or no opportunity for the development of the very thing that is most likely to mean success for them.

It is to be hoped that those responsible for the future development of American education will some day heed to the many requests by men like the late Dr. J. P. Haney, director of art for the New York high schools, and a careful student of European methods, for central schools of applied art and where these are not feasible, provision to be made for specialization in this work in the regular high schools.

Until something like this is accomplished it is foolish to talk of the development of an "American Art." The art of the Swiss and the French has its birth in the schools. Here it is guided and brought to maturity and eventually becomes a part of a national art with which we cannot compete, but instead must send to Europe our raw materials and then buy them back at from one hundred to five hundred per cent advance for the art that Europe puts on them.

The Swiss have also been very successful with their trade schools. The one at Winterthur is a fine example of an all-day trade school where young people go to learn the trades of pattern making, machine shop work, smithing, and precision work. Candidates for this school must be 15 years of age with an education that parallels our eighth grade. All entrants are required to take a competitive examination. About forty per cent are flunked, another

twenty to thirty per cent are weeded out after three months of probation. Practically all of the remaining selected group graduate. This is in strong contrast to the entrance requirements in some of our vocational schools.

The product of the school is commercial, and an interesting feature is that the pupils are paid a small wage for the work they do. This is kept for them until they graduate, when they receive a check which enables them to purchase a good kit of tools and obtain their first start. Some of the best machinists and precision instrument makers in the world are trained in Switzerland. A visit to one of their trade schools is convincing proof of the remarkable efficiency of their training.

Still another interesting feature of school work in Switzerland is the amount of time devoted to domestic science, which for the classes that parallel our seventh and eighth grades is one full day a week of seven hours. Again this is in strong contrast to the eighty minutes a week allowed in many of our schools. The academic work in no way suffers as a result of the special activities. In fact, it is benefitted as there is a close correlation.

MACHINE SHOP IN METALWORKERS' SCHOOL, SWITZERLAND.

The secondary schools are models of academic thoroughness, but in no way parallel our American high schools when considered from a democratic standpoint. They are really preparatory schools for those who expect to go on to higher institutions of learning or into the professions.

Industrial Education in Germany

Germany's remarkable progress before the war can be traced directly to her educational policy. Prior to the war there were two forces at work in the country. One led by educators, like Dr. Kerschensteiner, was doing everything to develop industrial and fine arts education. While they had in mind the training of individuals to the highest degree of efficiency, they were also keenly interested in backing up the national educational policy of making a sharp division between those who were destined, largely by the social policy of the country, to work with their hands and those who were to work with their heads. In the descriptions of German education, we constantly find references to the "hand workers" and the "head workers."

It is rather amusing to recall the trips which certain American educators made into Germany for the purpose of studying industrial education. Many of these men returned home full of praise born of a temporary enthusiasm for a new type of school. They forgot entirely to analyze thoughtfully the democratic ideals of our country and to compare them with Germany's autocratic system.

The second influence was that of the politicians and war lords who backed this type of education not because of a love for the individual or for his success, but rather because of the desire to secure highly trained hand workers that would go far to further their schemes for world supremacy. Money was spent lavishly to build schools for this purpose, and nothing was too good nor too expensive to insure the success of the plan. This is all the more significant when it is remembered that the German people, as a whole, are thrifty. The German politicians backed the expenditure of vast sums to insure, first, industrial and commercial supremacy to be followed ultimately by a fight for political supremacy.

For the moment Germany's educational program is suffering from lack of capital and unified political support. The seed, however, of Germany's educational schemes has taken deep root and while for the time being the flower has faded, the roots in many cases, remain unharmed and it would seem that Germany today is bent on pursuing the same kind of educational policy in the future as she has had in the past. This is distinctly unfortunate because, unless Germany permeates her educational scheme with more of the human element it does not require a philosopher to see that history may again repeat itself in a war even more terrible than the one we have recently passed through.

There are, however, educators in Germany whose policies will tend to avert such a calamity. The war has not been without idealistic and democratic reactions, and there is ample evidence in several important sections of Germany that the schools are working toward a democratic ideal to bring up a generation in freedom and inspired with religious, moral, and political ideals that will give Germany a place among the democratic nations of the world.

France Changing Her Educational Policy to Compete With Germany

At the present time France is busily engaged reorganizing her educational policies on lines somewhat similar to those of Germany whose first objective has been the development of an educational system that has for one of its main aims the protection of the country as a whole. France, like Germany, is putting on one side those who work with their hands and on the other the head workers and while scholarships are offered more or less freely, the

majority of them go to the children whose parents have social standing, rather than to the poor man's sons or daughters.

The war has left France fully alive to the fact that she must do everything in her power to hold her high place in the art and industrial world. Perhaps the situation can best be summed up in the words of Marcus Vachon, who, as a result of a survey made for the French government during the latter part of the war, said, "When the great military war shall actually be terminated, a new war will commence, the artistic, industrial, and commercial war, under conditions that will make it equally terrible and implacable." He goes on to state that the artistic war of tomorrow is not a simple rhetorical figure. It will be really and truly a war to the death.

In conclusion he says that "The organization of our artistic and industrial education is a work of national defense of the same importance as the organization of our armies." France is taking heed to this warning.

Many of the French school buildings are anything but modern, and some are lacking in equipment. In spite of these handicaps, the instruction is very thorough and the pupils apply themselves to their work in a manner that is foreign to many of our schools where facilities are very much superior.

England's New Educational Policy

When considering England we are apt to think in terms of much social division and a traditional system of education which we in America have very little use for. For a number of years preceding the World war, England was too busy engaged in keeping pace with Germany's navy to think very much about the development of her educational system, but the war taught England many lessons, not the least of which was the discovery that all was not right with her educational policy. It must be said to her credit that she immediately set about to rectify matters.

Her educational act of 1918 is directed to the development of the individual not as a tool of the state nor as in the past a victim of tradition, but as a future citizen having God-given rights of his own irrespective of social standing. This educational act of 1918 is, for an old conservative country, a remarkable piece of legislation.

Every possible provision is made for the development of young people along democratic lines. Class distinction which has been so evident in the past has been practically eliminated. Special provision has been made for the teaching of all types of industrial and applied arts work. Approximately twice as much time is given to these phases of education as in this country. Many of the changes are apparently the result of a study of our American system as constant reference is made to what is being done here.

In a syllabus of 400 pages, published by the Board of Education of the London County Council, on the teaching of the English language, reference is made to some of the work in the Newark schools and fine tribute is paid to American elementary education by a well-known English educator, who, writing with sympathetic appreciation of the ordinary British soldier in the lines and comparing him with the men of the American Expeditionary Forces, says, "The only trouble is that their standard of general education is so low. Put the product of the old elementary school side by side with the American men from overseas and his mental equipment is pitiful. The overseas man with his freedom from tradition, his wide outlook on life, his intolerance of vested interest and his contempt for distinction based on birth, rather than worth, has stirred in the minds of many a comparison between the son of the bondsman and the son of the free."

A number of experiments are going on in England, which are well worth investigation. Much emphasis is now being placed on industrial arts work. Moreover, it is not confined to those who are destined for the industries. We often hear it said of our own high schools that girls and boys taking the classical courses do not have time for practical activities. It is interesting to note that one of the finest classical schools in England that prepares entirely for college and the professions, requires each boy to spend one whole week in every ten in the work shops. The claim is made, and it is undoubtedly true, that these special activities do not detract from the academic work, but rather tend to improve it.

As a result of my visit to various school systems in Europe and after a careful comparison between our methods and theirs, I have drawn the following conclusions:

1. Just as we make special provision for the abnormal or subnormal child so we should offer special facilities for the talented child whether it be along academic, industrial, or art lines.

2. There must be more universal recognition of learning by doing especially in the primary and elementary schools.

3. Whenever we are attempting to train for the trades whether it be preliminary training or otherwise, it is very essential that the right contact be made with industry.

4. We must recognize the fact that practical activities, domestic science, and art, etc., so far as instruction in elementary schools is concerned, should be a part of every child's general education.

5. We must raise the standards of entrance into the teaching profession for those who plan to teach the special activities.

6. We should only admit those pupils to our high schools, vocational or special training institutions who have the ability and desire to profit by the work offered.

7. We must see to it that our democratic policy pertaining to secondary education does not result in a haphazard jumble of courses leading to no particular end.

8. Our aims and objectives both in special and academic education need to be clarified in such a way that our procedure may be clear cut and definite.

9. Every effort should be made by educators and others interested in the education of the young people of America to see that politics are kept out of the schools. Only by so doing can the aims and ideals of a democracy be maintained.

10. We must constantly keep in mind that ours is a democratic country and that our policies must, therefore, be democratic which means we must keep as many educational doors open as possible, irrespective of the financial or social standing of those who enter them, taking care meanwhile that the various groups are more selective so that all will profit by the training offered.

In conclusion, it is decidedly worthy of note that with all the educational facilities offered in the countries under discussion, America is far ahead in secondary education. Moreover, in spite of all our faults there is no question but that the American child excels in initiative. Whether this is due to our democracy, our educational policies or a native instinct is open to question.

Perhaps one of the preventives of future wars will be a better understanding of the educational policies of the various countries of the world, so that each may give to the other their best in art, science, and industry and by so doing develop a world democracy that will make future wars impossible; giving each individual his God-given right, irrespective of birth or financial standing, namely, an opportunity to develop along the lines for which by nature, environment and heredity he is best adapted.

Automotive Science and Practice as the Basis for Industrial Arts in the High Schools

Ray F. Kuns, Principal, Automotive Trades School, Cincinnati

IT IS very likely true that there is no one item which touches the lives of so many of our people today as does the automobile and those kindred subjects which are classed with it under the term automotive. The term automotive includes practically all those units of transportation which are dependent for power on the internal combustion engine as typified by the gasoline motor. This means the truck and the tractor, the passenger car and the motor bus, and the airplane and motor boat. These units of transportation are far-reaching in their influence and interest. When, to this influence is added that of the radio, the field is increased to the point where it includes practically everyone. And radio has been taken over so far as sales and service are concerned by the automotive industry. So for the present discussion, we will consider that it belongs with things automotive, although not much consideration will be given its possibilities.

I am convinced that there are two essentials to the success of any course of industrial arts in the high schools. In the first place, the course must not be narrow. In the second place, it must be so arranged as to appeal to the interests of the youth, at the age when he is certain to be in some course in our high schools. Industrial arts courses are usually elective, along with many other courses. If a boy elects a course, it is because he is genuinely interested in the course or else is selecting the line of least resistance.

The question of interest in automotive mechanics is readily answered. Every manufacturer of automobiles gets out a manual telling the owner how to care for his car. These are eagerly studied by the new owners. Our newspapers carry a large amount of syndicated material on the care and repair of the automobile. Automobile schools of private status have thrived for years. Our young men talk gear ratios, combustion space, piston displacement, vibration, lubrication, power, speed, hill-climbing ability, roadibility, brakes, bumpers, shock absorbers, snubbers, steering gears, toe-in, caster, cooling, ignition, volatility, viscosity, vaporization, and similar items until we are given pause at the amount of their knowledge. They are only equaled in their learning by 98 per cent of the young ladies and excelled in their wisdom only by 99 per cent of the adult population.

The exceptions to the above only prove the rule. One man recently told me that he never wanted to own a car, but that he dearly loved to ride with the other fellow. He said he did not want to have to spend every Sunday morning fixing it up so that he could ride in the afternoon, but every chance he gets, he comes around to see me work. A learned doctor of philosophy recently told me that he had only looked under the hood of his car twice in his ten years as a driver but this same man could tell visitors to the school things about automobiles and automotive equipment far in advance of anything as yet placed on the printed page.

So the contention that the interest in automobiles is universal, is beyond question. Our very existence is largely dependent on our interest in and ability to avoid them. Even the pedestrian learns much of the mechanical possibilities of them. He is interested in seeing what feats of strength and skill he can make the motorist perform, in partnership with his help. He knows apparently to a split hair the distance in which you can stop your car, and to a split second the time he may allow in crossing ahead of you. The phase of automotive work which appeals most to the industrial arts teacher, however, is the interest of the high school boy in things mechanical and in working with automobiles and other automotive equipment.

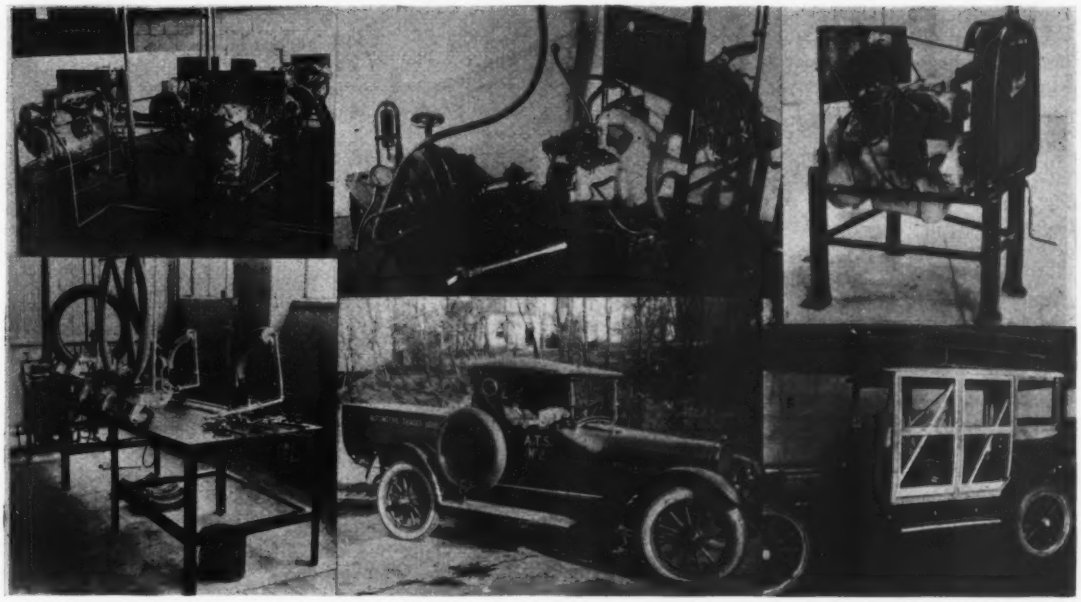
This healthy interest is normal to a live American boy and should be made use of. Using this interest brings the teacher and administrator of industrial arts up against the second phase of the question, or rather the one mentioned first, and that is the content of the course. It was stated that the industrial arts course must be broad. To teach a high school boy auto mechanics in order that his family may be able to save a few dollars on their repair bills, is poor economy. It is bad economy so far as the community is concerned, and may be very wasteful of the time of the boy. On the other hand the automotive work is so encompassing in its ramifications that a real study of it is certain to lay the foundation for a splendid understanding of science, as well as to give a real appreciation of modern industry.

If automotive work is to be made the basis of a course in high school industrial arts, we take it that it is to have a bearing on the entire course the student is to pursue while on his high school career. On first thought this may sound presumptuous. On more sober thought it may sound not only plausible, but it may commend itself to industrial arts people, because of the fact that it is so broad and that it does touch life in such a real and worth while fashion. Industrial arts courses are planned with an allowance of so much time for shop work, so much for English, so much for general science, so much for drawing, so much for physics, so much for woodwork, so much for metal work, and so on and on.

The keynote of success in any work whether it be educational or industrial, or whether it be the combination of these to give industrial education, is that the work be properly motivated. It goes without saying that a student of industrial arts without the proper interest in the course, or who finds that his science work and his mathematics, his English and his drawing are disjointed from his other work and uninteresting, will get a great deal less from his course than if he found a keynote of interest holding all the way through.

Consequently, when we think of automotive work as the basis of a course in industrial arts for our high schools, we must think of it as the leaven of the entire course and not only as the basis of the shop work or the basis of the drawing work. Presumably this is a field of industrial arts education as yet to be worked out. The speaker is certain that his experience is not such that he can more than suggest the possibilities in the way of such organization. However, it would seem that from the wealth of shop material and mechanical processes, it would be a rather possible feat to work out a broad plan of academic pursuit which would well fit the industrial arts high school graduate for either life in industry or for an university career. Naturally the greater part of this paper will be devoted to the discussion of the shop phases of the industrial arts course which might be developed around the automotive work. After a consideration of

Editor's Note. The present paper formed the basis of an address before the recent convention of the Western Arts Association at Memphis, Tenn., May 8th. Lest the standpoints be considered too radical, it may be stated that the author has actually carried out many of the principles and methods advocated in the school of which he is principal.



TOP (left to right): 1. Engines on block must be cooled. In this case pipe fitting is involved both for cooling and running out exhaust gases. 2. A Prony Brake Dynamometer. The designing of a machine of this nature involves the application of a wide range of scientific theory and practice. Building the machine requires machine shop and general metal working equipment. Its use opens up a field of mathematics, general science, physics and English which is almost inexhaustible. 3. Rebuilding Engines and fitting them into specially designed and constructed stands is a fair course in general metal working.

BOTTOM (left to right): 1. This vulcanizing table was a splendid metal working problem. It involved pipe fitting for gas, water, steam, and air. The table must be built with a provision for draining the condensation from the molds. Vulcanizing offers wonderful possibilities in science and chemistry. The temperatures of the molds for the various steam pressures, the steam boiler, the gauges, compounding of cements and rubber, tire structure, cause of tire failure, and methods of scientific tire and tube repair is a wonderful field of valuable information. 2. A service car turned out in school shops. Chandler frame and rear axle; Reo front axle; Gemmer steering gear; Continental engine; Republic transmission; Spicer universals and other assembled units. Service body built onto Chandler body. Body covered with Fabricold. Transfer lettering by students. 3. Building or rebuilding automobile bodies for passenger cars is a task worthy of the efforts of any one. It is done in home shops, why not in school shops?

those phases the equally important possibilities along the line of academic correlations will be briefly outlined.

Industrial arts work in our high schools has long pursued certain rather definite lines. It is recognized today that we have advanced beyond the time when it matters greatly what a student may make, and the tool processes involved in making whatever may have been assigned or selected. It is generally agreed that a student ought to acquire an understanding of the tool processes and of the materials which have played such an important part in the developing of our present day industrial system. Industrial arts might be interpreted as an understanding of the arts of industry. But industry today has such a variety of arts that we have had perforce to select some from the many which we would endeavor to teach in a way which will give the students an understanding of some of the fundamentals of those arts of industry.

We have long had shops fitted to teach woodwork, metal work, electrical work, and drawing. More recently we have added automobile work in many centers. Printing has been well established for years. Radio, too, a new entrant in the field, is at present in the experimental stage. It is not supposed for an instant that it would be desirable to discontinue any of the older subjects such as the wood shop or the metal work. However, with the automobile work as the motivating interest, it is felt that there would be a definite influence on the work which would be done.

It would seem that the time was well past when woodwork for woodwork's sake could be justified in our schools, unless the course be purely trade or vocational. The same thing holds for forging, foundry work, printing, automobile work, and any other subject in the course. I am not certain that this will be granted by all, but if it is, then it is safe to say that, if the real idea sought is an understanding of the arts of industry, it is not of great importance as to just what phase or process of woodworking is taught, but it is highly important that some phases of it be given. Likewise, it is not of much moment as to whether we teach certain metal working processes in a certain specified order, but it is extremely important that the student have enough experience in the metal working phases to understand the material and to get an understanding of the art of metal working, essential to his understanding of the part metal plays in our industrial life. Aside from wood and metal there are a multitude of materials which are prominent in our industrial life, and which may rightfully claim a share of our attention, in developing a well rounded industrial arts course. Just at present, however, we hold to some of the more familiar shop subjects in order to better follow the theme.

So far we have asserted that we must have the work motivated and that we must do work in wood and metal and kindred materials. We have said that the kind of wood or metal work is not important and now it is proposed to say that it would be well for the motivating interest, to suggest the particular piece of work to be done. It will be seen immediately that the cabinet shop will not serve such a need, the pattern shop will not serve such a need; neither will the forge room, the machine shop, the automobile service room serve such a need. The work will be general and this suggests a general metal shop and a general wood shop. Painting, upholstering, vulcanizing, and some of the lesser types of work will possibly be cared for in one of the general shops. On the other hand, it will be possible to retain the established shop equipment and to adapt the shops to handle the types of work suggested by a course of industrial arts work based on the automotive work.

Previous to a discussion of the types of work certain to suggest themselves in a community where industrial arts work is organized on this basis, the author would like to make it clear that he has a rather exact appreciation of the attitude of the industrial arts teacher. The statement has been made that an article made from wood or metal is not at all important. To put the matter even

more definitely it is not important that the student make a pattern of a pedestal, an automobile body, a library table, an automobile hood, a window refrigerator, a horn bracket or a lathe center. I do believe, however, that the student's interests should be considered and that, whatever work is turned out by high school boys, ought to stand the inspection of the industry whose arts we are learning. Like many other bridges this is one easily and safely crossed when we come to it. It is felt that the industrial arts shop work ought to be all that any high school boy could ask and it certainly ought to be all that he could master. The school shops ought to be, not only the equal of any home shop: they should be more, they should be better and as a rule the equipment is better. A great deal of very real industrial arts work is done in our home shops. Much more is attempted. The school ought to help to make all of it the best possible. This is mentioned in passing in order to suggest that the homes will be sending work in, once the people who make the homes understand that the school organization is willing to give a helping hand.

A study of the illustrations will give an idea of some of the types of work as well as some of the processes in detail, which offer themselves where the automotive work is made the basis of the entire industrial arts course. Although these illustrations are of work done in a trade school, that fact has little bearing in the matter under consideration. Of necessity the work of the trade school is rather limited to those things which are immediately helpful in training the apprentice or helper for his job. Everything is in favor of the industrial arts course. The student is not pledged to learn cabinet-making or machine shop practice, or painting, or some trade. Rather he has been given to understand that he will be grounded in the fundamentals of an appreciation of the arts of industry. Nothing accomplishes this purpose nearly so well as doing something which makes some material serve the doer in a way in which he has never been served before. A man caught by a fire on an upper floor of a dwelling will earnestly seek a means of escape from his peril. He may make a rope from the bed clothes. After he has lowered himself safely to the ground with the improvised rope he has a new respect and appreciation, not only for the fabric of bed clothes but for his own person as well.

An appreciation of the arts of industry is dependent on having personal or community needs met and served. This is fundamental. Industry is service. If you are approaching the railroad track and a train appears, you depend on your brake material, on the brake bands to stop the car and save your life. The appreciation which personal service, as rendered by material things, he gets, is well illustration in the case of any motor car owner. Who ever met a car owner who did not swear by his own car! Every garage owner in town may swear at it, but the owner swears by it. This is solely because it has given him service. When the industrial arts are well motivated, the personal service ideal is given an opportunity to develop. Because of the wealth of materials encountered, and the variety of the work which may be involved, the automotive mechanics lends itself as an ideal basis upon which to build up the proper interest in the industrial arts course. Some of the projects and processes suggested by a study of this subject will now be briefly discussed.

Woodwork—Wood has long been the foundation for automobile bodies. The percentage of all steel bodies is steadily increasing, but the time when wood will be entirely displaced is apparently a long way off. In the closed car body, particularly, is wood almost essential. The streets show an array of special motor car bodies. This type of building seems to have a very real appeal to many high school boys, as is witnessed by the speeders which one sees here and there. Truck bodies, bus bodies, speedster bodies, airplane models, motor boat hulls, radio cabinets as well as the more conventional sedan or winter enclosure offer a vast field for a general run of woodwork. Coach work, cabinet work, ship carpentry or boat building, are offered in all grades, varying from the rough, heavy work to the finest of handwork in wood.

The use of the automobile opens a field of related work in wood which has as its sponsor an interest in equipping the car for camping, hunting, fishing, or touring. All manner of camp equipment may be devised and worked out. The purchase of a motor car is quite often the golden opportunity for working in a real piece of carpentry. We refer here to building the garage.

Radio offers an opportunity for all grades of woodwork, from the rough carpentry necessary to mounting an aerial mast, to the very finest woodwork in the building of tables and cabinets.

Pattern-making frequently serves a very real purpose in turning out patterns for parts which must be replaced on automobile work. In other cases ambitious students are building model gas engines, outboard motors, electric motors, and similar projects. As a rule enough demand is made on the pattern shop department in a progressive industrial arts department to keep the students busy. Patterns need not be made for the sake of the experience; only patterns which are to go into the sand ought to be given consideration.

Metal Work—The machine shop which is motivated by and built to serve the automotive interests of an industrial arts department need never lack for real problems. There can be slight, if any excuse, for doing things just to be doing. The development of the automobile instruction places such demands on the machine shop that it is more than busy building things which are essential to successful instruction. These parts are of several types. One is the part which is made to replace a worn part in some unit of an automobile, and the other which may be even a larger field is the machining and assembling of models for instruction in automotive theory and design. A study of the illustrations will suggest some of the equipment which may be constructed.

Engines may be sectioned, as may also all other units of the car, as the transmission, rear axle, universals, pumps, carburetors, etc., to show the principles it is desired to teach. Special stands may be designed for ignition or other instruction. Dynamometers offer a splendid amount of real construction work for the machine shop. When they are completed and in service, the automobile work itself is made more worth while because of the tests possible. All manner of light machine tools may be constructed and placed in the automotive shops to serve the demands certain to be placed on them. This point is illustrated by the grinders and drill shown in the photographs.

A need for electric motors in the case of the Automotive Trades School was the occasion for designing and putting into production the three-horse-power electric motor illustrated. This has afforded a real problem for the machine shop. All of these motors are ball bearing and to date have proven the equal of the commercial product.

Engine and equipment stands have been the source of much worth while work which might be termed general metal work. Welding, brazing, soldering, forging, tapping, drilling, use of hand dies, pipe fitting, sheet metal work, riveting, filing, sawing, and an almost endless number of tool processes are involved in doing this work.

Incidentally, of course, the boys building the stand and fitting it out, must stay with the work until the power plant is complete and the engine operating properly.

The work involved in taking an old power plant from a car frame, fitting it up with a good stand, insuring its cooling, providing fuel, and all controls, and then seeing that every part is in working condition, is a rather liberal industrial arts education. It is likely that the engine will need to be rebuilt, and to have new parts fitted. The starting motor may need overhauling, as will also the generator and ignition apparatus. This together with the installing of the battery, the running of new wires and finally checking through the finished job to see that all parts function properly, constitutes a real practical course in electricity. Overhauling and fitting up the fuel system are a wonderful opportunity to apply general science. The cooling system is often connected with the city water supply, and this involves pipe fitting. A careful study of this one project shows a vast number of diversified processes which must be understood and mastered in order to have a completed job which functions properly. It is far better, in my estimation, to allow the job to be carried through from start to finish wherever this is possible, by the same student or group of students. When the rebuilding and assembling are all complete, the final point of interest is to allow the student to make his dynamometer test. By comparing the result with other similar tests and the rated output of the plant, the quality of workmanship is evident.

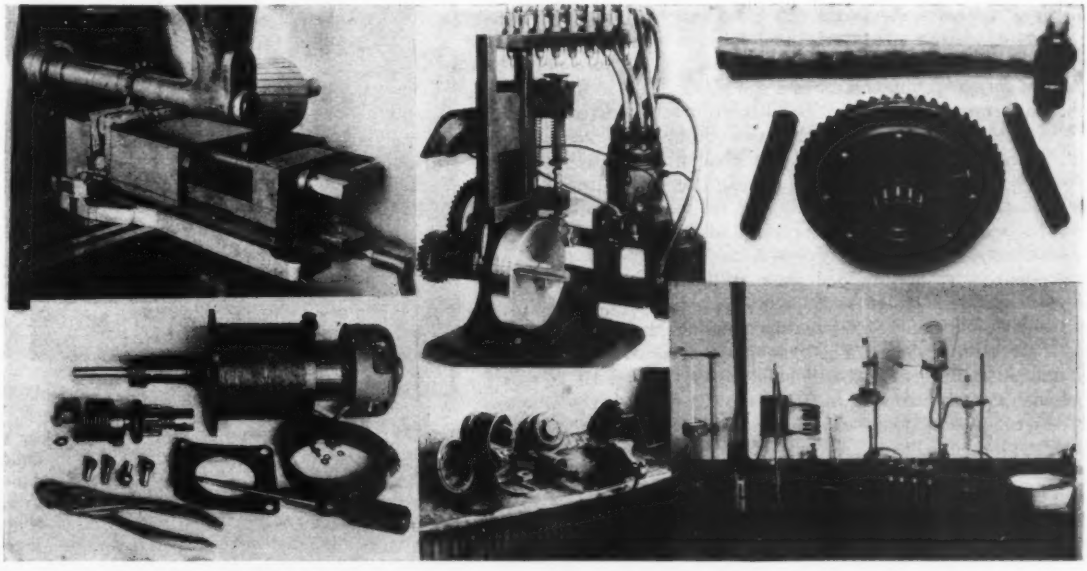
The field offered for coordination between the automotive and the electrical work is very real. Automotive electricity involves practically all phases of electrical theory when the automobile plant alone is considered. When the radio is considered along with the automobile a well-rounded course is suggested. Testing electrical equipment of the automobile, and its care and repair, offer real problems in electricity. Automobile equipment is likely to fail because of the hard condition of its service. The student who develops to the point where he knows the indications of tests on such equipment, is well on his way to becoming an electrician. The same may be said for radio.

Other phases of interest offering themselves when we consider the automotive mechanics as the basis of the industrial arts course are vulcanizing, painting, upholstering, lead burning, battery repair, oxy-acetylene welding, and so forth.

Work in the automobile shops is quite varied. Repair work is more than simply a question of taking down parts and reassembling them. It is true, in many cases, that the repair work is a matter of disassembly, cleaning, inspecting, greasing, and reassembling, and a fine sense of fitness of things must be developed to insure service when new adjustments are made. In spite of standardization, however, parts do not always fit readily. Files, reamers, and even machine tools frequently must be used in automobile repair.

Provision is not always made for taking up lost motion and play occasioned by the wear of parts in service. Estimating a job properly, and selecting the proper method of making a permanent repair, is a process requiring thought and care. As a rule, in rear axle and front axle overhaul, transmission and clutch repairs, and in steering gear repairs, the trouble is corrected by removing old and inserting new parts which may or may not require hand fitting.

When repairing or overhauling the automobile engines offered to the school service department, or in rebuilding those purchased for the school, the real test is placed on the teacher and the student. The margins between correct and incorrect practice are very narrow. If a piston is turned on the lathe to fit the bore of the cylinder, it must not vary by more than one or two-thousandths from the size predetermined for it. A mistake in determining the size to be used is not allowable. Rebuilding and running in an automobile engine is one of the real arts of industry, and keen minds and skilful hands are required. Contrast the fitting of piston pins in an engine piston to the usual run of exercise work in a machine shop and we find a vast difference. In engine



TOP (left to right): 1. Cutting a key way in an armature shaft; the milling machine vise built by students. The armature was built for a 2 H. P. electric motor. 2. Engine design and ignition practice instruction stand. The construction of stands similar to this offers real machine shop practice. Its use clears up ignition timing, engine timing, the four stroke cycle and other automotive theory. 3. Riveting is one of many hand processes involved in automotive work. Rivet sets shown made by students from Ford axle shafts. These rivets must be applied hot.

BOTTOM (left to right): 1. Overhauling Ford starting motor. Work of this nature is worth while as it involves electrical theory and practice as well as mechanical theory and practice. 2. Three horse power A.C. Motor, three phase 60 cycle. Work of this nature involves pattern making, foundry work, machine shop practice of marked accuracy, electrical work requiring extreme care, assembling and other processes. Some castings were purchased and some made by high school students. Stampings for the laminations were purchased. A number of these have been built in the A. T. S. by ninth year students. 3. Experiments in lubricating oils, viscosity, fish test, etc., studied. Viscosimeter built by students.

work, parts fit and are used; or they do not fit, and must be scrapped. This very fact, however, is the thing which keys the student up to the point where he works at highest efficiency and it might be added, in most cases the highest efficiency of the high school boy is equal to any problem which presents itself.

We could go on indefinitely citing detailed processes where it is necessary to use extreme care and rare good judgment in accomplishing the end desired in engine building. Boring, honing, reaming, lapping, filing, grinding, scraping bearings, burning in bearings where the very last bit of sharp wit is required, and so on, through the problems of lubrication, electrical systems, ignition, cooling, carburetion and on and on.

After all, however, it is a question of the mastery of tools and materials. There is no more justification for automobile work for its own sake than for any other type of industrial arts work. It is believed that any industrial arts work to be of most value must challenge the interest, skill, and wit of the student. Automotive work is believed to do this in a manner peculiar to automotive work alone. It is so varied that a boy taking a thorough course based on it, and built around it, will have an unusually keen appreciation of the value of tools and materials. He will appreciate the relative value and merits of the various materials common to our industrial age. He will be able to select and put these materials to use in the service of himself and others. In other words he will have an appreciation of the practical side of some of the most important arts of industry.

It was suggested in the early part of this paper that there was a definite place for science, drafting, physics, chemistry, English, and the other academic subjects in a well planned course in industrial arts. I would suggest the term automotive science and practice as covering both the shop work and the greater portion of the academic work.

If we could give our high school boys an understanding of the fundamentals back of the automotive industry, they would be so full of knowledge that they might be called scholars. As a matter of fact the automotive industry is so vast that we can not grasp even a portion of its portent. Great laboratories and engineering establishments, foreign business involving sales to all foreign nations, salesmen, finance, factories, shipping, all of these and many more lend themselves to the course discussed.

A study and mastery of the laws of physics, science, and chemistry underlying the principle of the internal combustion form a field offering a wealth of real material for student and teacher. Metals and their alloys, rubber and its vulcanization, carburetion and vaporization in connection with the laws of gases, the principle of the lever, gears, and the inclined plane, will be found points of contact with this most wonderful industry. The mathematics involved in designing a motor car would be sufficient to fill books. The principles of drafting and design, as applied to the automobile, could never all be included in any four-year high-school course.

In conclusion, we would like to suggest your careful consideration of the possibilities of motivating a course of industrial arts in the high schools by building on the basis of the automotive work. It is further suggested that the title automotive science and practice be considered in this connection.

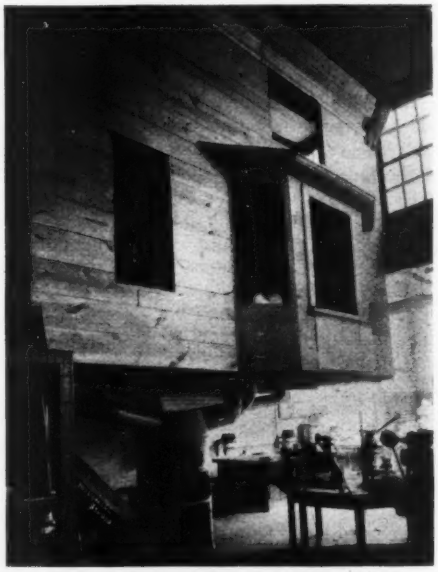
It is realized there are difficulties standing in the way. I know of no group, however, better able to meet and master difficulties. It will help to revive the interest in industrial arts where it is found to be waning. It is so full of real problems that the high school boy is attracted to. Encourage the boys to bring in work, to undertake home work, and give them a lift when needed. Worth while boys are doing things without the help of their industrial arts teachers, which they might do much better with a little encouragement.

Finally, a word about the teacher problem. A course of the nature suggested is dependent on the teacher in a larger measure than usual. Teachers not cordial one to another, and teachers who offer rebuffs to boys, will not make such a course a success. Just as the shops must be general, so the teachers must be men with broad experience and wide vision. Teachers of pattern-making, cabinet-making, of sheet metal, or teachers of any one single subject will not be successful. To be successful in this work of industrial arts founded on the basis of automotive mechanics, a teacher must be well grounded in the arts of industry. This calls for some real, intensive, and constructive work from our teachers' colleges. No teacher need hesitate about giving his best efforts to working out a course in automotive science and practice. He may be a cabinet-maker or a machinist by trade, but he must be a teacher by profession, with an honest effort to make his part of the work a success in order to bring merited recognition from the public and win the esteem of his pupils.

HOUSE MODEL TRAINS SHEET METAL WORKERS

Geo. F. Paul

A miniature house built right in the schoolroom is proving of practical help in teaching sheet metal work in the trade school at Erie, Pa. Through the use of this model structure the young men learn the principles of heating, ventilating, cornice work, roofing, metal casings, eavespouting, and other subjects.



HOUSE MODEL USED IN TEACHING SHEET METAL WORK AT THE TRADE SCHOOL, ERIE, PA.

This house, which is 12'x18', has two stories, each 6' 6" high. It is left in the rough to be the same as houses are when the sheet-metal worker is called on to install his work. It is set on supports so as to allow room for a furnace to be installed. The mathematics instructor has here his chance to teach the heat loss through different mediums, the number of thermal units needed to heat the rooms to the desired temperature, the sizes of pipes to carry the heated air, the size of the cold air duct, the grate surface necessary to provide the desired heat. The location of the furnace and registers is discussed and studied. The different styles of registers are studied and their efficiency compared.

The Rhode Island School of Design

Marjorie Nind, Grand Rapids

I AS the good fortune of the writer, very ently to be a student in the jewelry de- ment of the Rhode Island School of De- n in Providence, Rhode Island. This ol has several interesting and unusual features probably not familiar to the majority of industrial arts teachers and students. In the first place, although its jewelry department is the leading one in the country, it is little known by teachers of jewelry, except in a comparatively limited area. In the second place, the school not only has the leading jewelry department of the country, but is much larger than one would think from the scope of its reputation. This lack of knowledge of the school is probably due to lack of advertising. The school was founded to train young people to meet a local need. And it is maintained for that same purpose, drawing its students from a comparatively small geographic area; the school depends on local advertising and the quality of its work to recruit new students. Its plea is to young people going into local industries. In the third place, and the outstanding feature, is that although the school has the name of an art school, it is in reality a trade school as well. In fact more than half of the students would be classified as students in a trade school rather than in an art school.

Its name, the Rhode Island School of Design, is a misnomer, for the school is more than a school of design. It is in reality a school of art and industry, a real art school and a real trade school at one and the same time, with a complete union of the two, which is its distinguishing feature. It is an art school because it recognizes that art is the foundation of industry. It is an industrial and trade school because it is fitting workers actually in industry to become better workers and craftsmen, and is preparing those expecting to go into industry to become efficient trained workers. It does these things by using machinery and methods actually used in the trades, and by employing instructors in vital contact with trade and trade conditions.

MR. AUGUSTUS F. ROSE,
HEAD OF THE DEPARTMENT OF JEWELRY AND ARTSMITHING, RHODE ISLAND SCHOOL OF DESIGN.

THE NEW BUILDING OF THE RHODE ISLAND SCHOOL OF DESIGN.

The Rhode Island School of Design was opened in 1878 with a threefold purpose: the "instruction of artisans * * * that they may successfully apply the principles of art to the requirements of trade and manufactures," the training of artists and teachers of art, and the general advancement of art through exhibitions and lectures.

Carrying on the purpose of the constitution of the school there are at present eight departments: Drawing and painting, decoration, design, modeling, architecture, mechanical design, textile design, jewelry and silversmithing, and normal art. The number of departments and the character of their work has changed to meet the changing demand. The jewelry department is only 20 years old.

In September, 1901, the jewelry department had its beginning in a small class in arts and crafts. This class soon outgrew its first cramped space, and the demand for work not only from those interested in arts and crafts, but from apprentices in the jewelry and silversmithing industries, resulted in a new department in the school in 1904. A new room was fitted up, with the assistance of some of the leading manufacturers in the jewelry and silverware industry. The development of the department at this time was largely due to the interest and labors of Mr. Englehart Ostby, who was a member of the board of trustees and chairman of the advisory committee for the department. Being in the jewelry business he was especially interested and did many things for the new department, by visitation, wise counsel, and liberal material gifts. It was through his suggestion that medals and scholarships are given annually by the New England Manufacturing Jewelers and Silversmiths' Association to

SILVERSMITHING—STUDENTS' WORK.

encourage young men to better their positions by studying evenings.

The growth has been continuous in numbers, and in type of work, to meet the demands of students and of industry. The department was moved around from place to place as it grew. In January, 1921, the department moved to a new four-story building, built and planned for its particular needs. It occupies all but two rooms of this large building which looks more like a high grade modern factory than a school building. It is the only school building in the United States devoted exclusively to the teaching of jewelry and silverware design and manufacture.

The enrollment last year for the entire school counting day, night and Saturday classes was 1846. This large enrollment is surprising to a visitor or student, because not apparent. The classes are distributed through five buildings: the students in one department do not come in contact with those in another, and those registered in the day classes usually do not come in contact with the Saturday and evening students. Over one-half of the enrollment falls within three of the eight departments, namely in mechanical design with 406; textile design with 322; and jewelry and silversmithing with 228—a total of 856. All these students are scattered in the separate buildings for their respective departments. Then with 894 as the total enrollment in the evening classes and 513 in the Saturday classes, the enrollment is distributed over day, Saturday, and evening classes as well as in the various buildings and departments.

One of the reasons why the school is a trade school is that 1031 students are in the evening school or the vocational training class. The evening school students are either people in the trade bettering themselves by evening work or they are those in other lines of work looking forward to possible employment in the trade and using the evening schools as a finding agent. Probably the majority are already in the industry. The vocational classes are composed of students who are apprentices in the trade, and who under the Federal Act are given their tuition for attendance and are released by their employers to attend school. Last year there were 65 of these students in the jewelry department, taking jewelry design, jewelry tool making, stone setting or engraving. This year to increase the efficiency and the training of these jewelry apprentices, the boys are giving their own time to attending night school three times a week, in addition to the time on Saturday mornings when they are released and paid by their employers for attending school. This gives them ten hours a week of school work directly related to their work in the industry.

Another group in the school are the rehabilitation students, but this number is gradually decreasing until there will probably be none next year. There have been over 500 of these former service men registered and trained in the school. Practically all of these students have been placed in the trade for which they were prepared.

The courses which may be taken in the jewelry department are jewelry design, silverware design, modeling, jewelry making, silversmithing, engraving, toolmaking, hub and die cutting, lapidary work, electroplating, chasing, enameling and stone setting. These may be taken by anyone interested in any particular branch of the jewelry industry, or a student may follow the full three-year course of day work:

First Year

Elementary Freehand Drawing
Mechanical Drawing
Jewelry Drawing
Elementary modeling from Cast and ornament
Elementary Composition, sketching and perspective
Jewelry Benchwork

Second Year

Freehand Drawing, sketches of models, ornament and designs of jewelry
Principles of design, modeling
Theory of Color, rendering
Simple practical work: Saw piercing, bending wire
Soldering and filing
Repousse
Enameling
Hub and die cutting (optional)
Engraving (optional)

Third Year

Design
History of ornament

JEWELRY—STUDENTS' WORK.

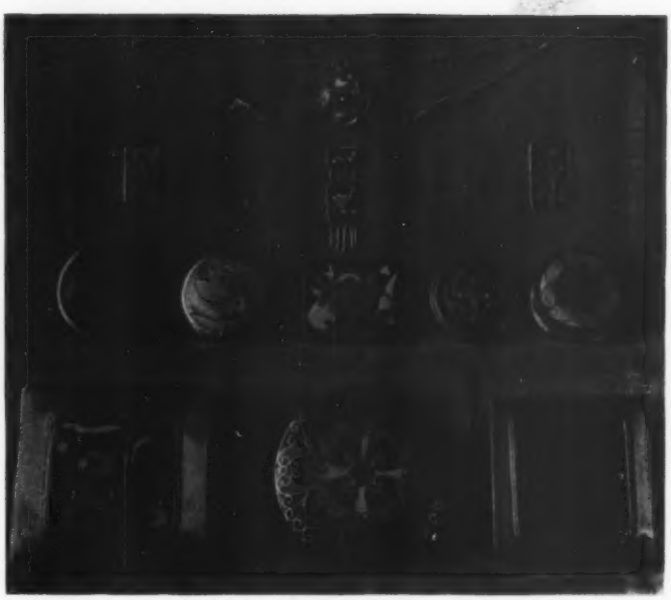
Nature Studies
Advanced Freehand drawing
Advanced Practical work
Jewelry making
Raising and hammering metal bodies
Repousse
Enameling
Modeling
Hub and die cutting
Engraving

The school is supported by private subscriptions, principally from members of the Metcalf family, sons and daughters of the founder of the school. There is, however, a small endowment fund of $50,000. The running expenses of the school far exceed the income from state and city, making it necessary at the end of each year for the Metcalf family to make up this deficit. The school receives bequests from time to time. The last and most important was the Lyra Brown Nickerson bequest of over two million dollars. This particular bequest was drawn on, to the amount of $250,000, to build the new jewelry building four years ago, and at present ground has been broken for a new museum building made possible by this bequest. Besides this the school receives federal money for the Rehabilitation students and for the vocational part time students. It also receives from the state $10,000 for general maintenance of the textile department, $12,000 for scholarships for students unable to pay tuition, and $3,000 for general school maintenance. The city of Providence gives $1,000 for scholarships, for the Saturday morning and evening classes. Other competitive and non-competitive scholarships are available to students from various other funds donated by interested groups or individuals.

The New England Manufacturing Jewelers and Silversmiths' Association has shown their interest and cooperation in the jewelry department for many years and in many ways. This interest was first started through Mr. Ostby. Through this Association the student doing the best work in the various courses receives a bronze medal suitably engraved. A scholarship is also awarded to the student making the best progress for the year. In 1912 Mr. Ostby was lost on the Titanic, and his sons have given the sum of $2,000 as a memorial fund, the interest to be used for yearly additions to the jewelry library.

The machinery and the new equipment in the jewelry building were paid for from funds raised by the Manufacturing Jewelers and Silversmiths' Association. Manufacturers cooperate with the school in every possible way, not only in financial aid and advice, but in sending apprentices for the various courses offered. Whenever there is a demand on the part of industry for instruction

SILVERWARE DESIGN.

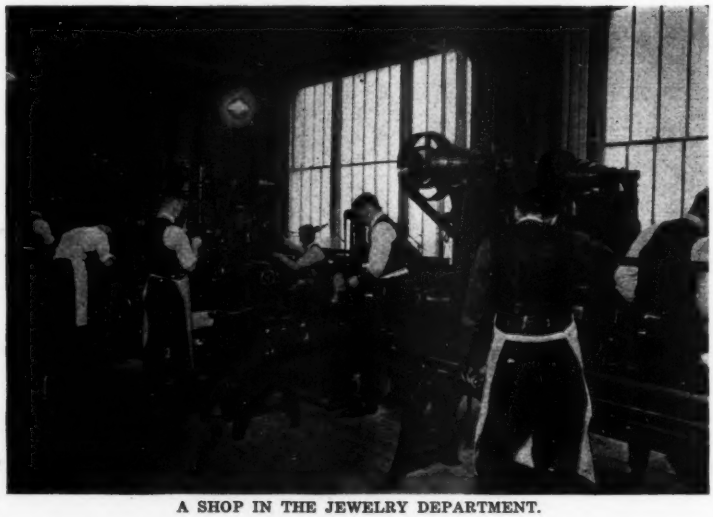


ENAMELING-STUDENTS' WORK.

in any subject related to the work of the school, and a sufficient number is assured, the school is ready to meet the demand by organizing and conducting such classes. This relationship between school and manufacturers is very close in the three departments, with the large enrollments, mechanical, textile, and jewelry.

In another way, and a most important way, the jewelry industry has shown interest and support of the jewelry department is in the matter of teachers. With the exception of Mr. Augustus F. Rose, head of the jewelry and silversmithing department, Mr. Antonio Cirino, instructor of jewelry design, and Mr. Frank Robitaille, instructor of jewelry benchwork, who are full-time instructors, the instructors are employed in some field of the industry and are loaned to the school by their employers, and in some cases without loss of their regular pay. This, of course, is due to close cooperation and interest in the school and its products on the part of the manufacturers. In this way the instructors are masters of their particular subject. They are drawn from various ranks in the industry, from foreman to bench worker, but everyone is a master of his craft and knows his work and its needs. Every teacher in the school has been, and is, in constant touch with the needs in the industry. The classes are small and the work individual, which means that every student receives personal attention.

The jewelry industry is third in Providence and the Attleboros. From figures compiled in 1914, there were 493 establishments, with an investment of $31,000,000, employing 17,500 people. The industry realizing that "the future belongs to the best educated nation" and that the old system of apprenticeship with the master training the apprentice by his side has broken down, has given its active support in loaning its masters to the school to use. The school realizing that art is the basis of all industry, and particularly of the jewelry industry, is giving much attention to design, the school museum and the school library. In order to furnish inspiration and stimulus from the past, the school is collecting in its museum and library examples of the best metal work of the past. The thing which is right artistically is the most effective industrially, because its possession is a pleasure, and the greater the pleasure, the greater the demand.



A SHOP IN THE JEWELRY DEPARTMENT.

Mayor Gainer in his address at the opening of the new building said: "The object of the school is to apply to trade and manufacture the principles of art in the hope that such application will not only help the prosperity of the industries of Rhode Island, but that it will make people happier and more contented by giving the future generation the ability to do the useful and beautiful work. * * * Through the aid of institutions such as this, America will retain her lead among the nations of the world. Without such aid she cannot hope to do so. Here in America, our higher plane and higher standard of living necessitate higher wages. To meet the demand of higher wages, we must have more experienced designers and we must have superior workmanship." Such a school meeting the need of a distinctive industry of a region is needed in other localities where types of work are centralized enough to support it.

Wild Flower Designs

Article II: Conventionalization With a Mirror

Nettie S. Smith

Indian Mallow

The Mallow family is one of the large plant families, numbering about nine hundred species. The hollyhock is a well-known representative of the Mallows, and cotton is another. Indian Mallow is sometimes called cotton-weed, probably because it bears some resemblance to the cotton plant; it does not bear cotton, however. This plant is a native of India. It has small yellow flowers, large velvety leaves, and very interesting seed pods. The drawings show some parts of the plant that are rich in design suggestions. The dark masses make these drawings most effective for use with a mirror.

Conventionalization

"Convene" means to come together, to agree. Conventionalize means to bring together in agreeable form. The naturalistic representation of a flower is not suitable for the decoration of an object, because it has not yet been brought into an agreeable form, or into harmony with the object.

Harmony

The decoration and the object to be decorated are in harmony when they have something in common. So the decorative design is conventionalized, or brought into harmony with the object, by giving it lines similar to those with which it is to be associated. Straight lines are helpful in this, and geometric forms are often used as a basis for conventional designs.

Methods

The beginner is often at a loss to know how to bring a natural form of three dimensions into harmony with a surface, which of course has but two dimensions. Symmetry is one of the first means of conventionalization, so the ability to make bi-symmetric units is of great value. We have already learned that one method of producing a formal unit is by folding and cutting, as explained in Article I. We shall now develop a second method of accomplishing this end.

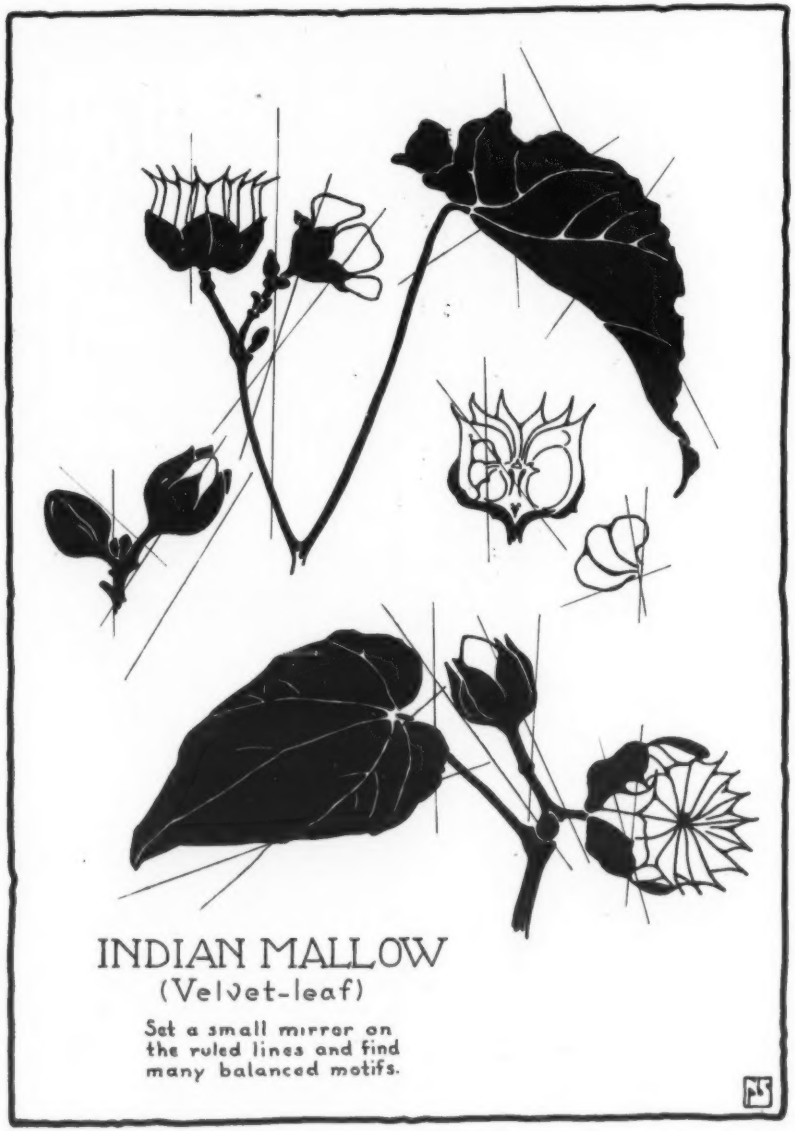
Finding Balanced Motifs

Place a small, straight-edged mirror, without frame, on the vertical center of a flower drawing and a flower will be shown having the two sides exactly alike. The mirror reflects the uncovered portion of the drawing, in a reversed position, so that we see a bi-symmetric form. Move the mirror about and choose the most satisfactory result, then draw a line at the mirror's edge. This line is the axis of the unit chosen. At B the left half of the flower has been reflected, while C shows the right half of the same flower. D is a twin unit obtained by placing the mirror on the line near A.

On the plant drawings are a number of fine, straight lines. Let the student place the mirror on each of these in turn, viewing the form at the left side with its reflection, thus producing a variety of new forms. Many others can be found in the same way.

Drawing a Motif

Now let us enjoy the magic of the mirror still farther. It will not only show us new forms but it will assist in drawing, helping to get results quickly. Suppose we decide to draw the seed pod, simplifying and changing as a designer is privileged to do, so long as he produces beautiful forms. If we draw the left side, and then place the mirror so as to reflect it, we get the effect of a complete drawing. (See F.) Changes may be made on this one side till the mirror shows a satisfactory result. Then fold the paper through the axis of the form, and rub the back of the paper firmly, so that the pencil marks will make a



INDIAN MALLOW

(Velvet-leaf)

Set a small mirror on the ruled lines and find many balanced motifs.

PLATE 3.

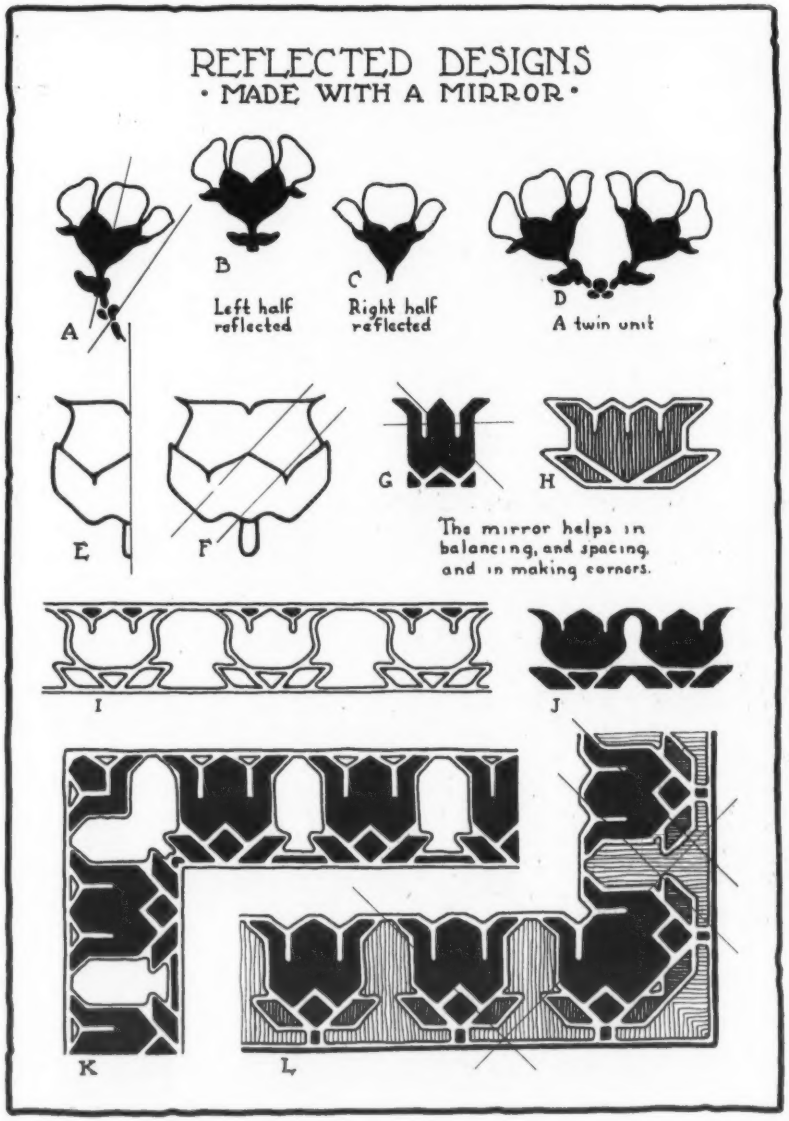


PLATE 4.

tracing for the other half of the design. This faint line may then be quickly strengthened and the unit is complete. A number of different interpretations may be developed in this way, as G, H, and I.

Spacing

Placement and space division are all-important in arranging a pattern. The mirror aids in composing a design by showing the results of placing units close together or far apart. Set the mirror near the unit and there is the effect of a repeat—two units alike, side by side. Do they look better close together as at I, or with a wide space between? Or shall they be joined, as at J? What arrangement gives the best background shapes? The different effects can be tested quickly with the glass and good judgment developed by the practice. When a choice of position has been made, the unit is traced and a border is easily finished.

Corners

Suitable corners are shown by placing the mirror across a border at an angle of 45 degrees. Unexpected shapes are thus originated, and they are sure to be in keeping with the border. K and L hold many other possibilities for good corners.

Abstract Forms

Interesting forms can be seen by placing the mirror on any figure, at almost any angle, as indicated by the lines across F. G. and L. Symmetrical and beautiful forms will be found, some of which are far removed from any resemblance to the original. These experiments stimulate the imagination and reveal possibilities otherwise undreamed of. The practice also helps the student avoid the mistake of trying to use naturalistic treatments for decorative purposes. He must learn to see beauty of line and form and to adapt them to the needs of decoration. Design is not imitation but adaptation.

Proven Problems for the Summer Camp Woodshop

Leon H. Baxter, Supervisor Manual Arts, Park School, Cleveland, Ohio

The problems worked out in the camp shop should be entirely different in kind from those of the school shop. They should be such as fulfill a specific camp need—useful, usable articles for the camp as a whole, for the councillor, or for the boy himself.

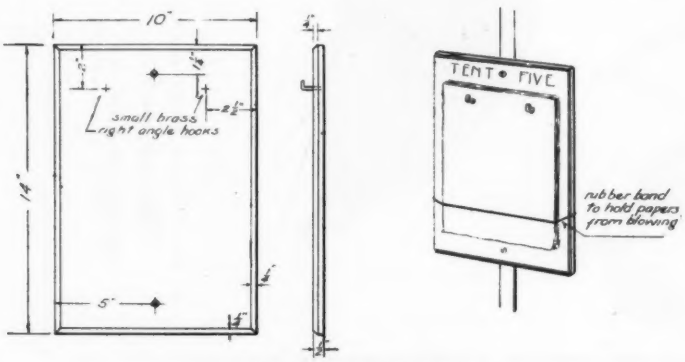
The problems here illustrated and described are a few of the many things that have been made and found worth while in twelve years of camping experience.

Besides the problems shown there are an endless number of things which can be made for the athletic department, for nature work, for the camp assembly room, for rainy day use, and for service as properties of the camp theatre. All of these kinds of projects are good fun to make and bring in a fundamental of camp life, that of "helping the other fellow."

Tent Bulletin

Every tent should have its individual bulletin board upon which the councillor posts the tent duties of each tent member.

A simple but efficient board is shown in the accompanying drawing, which calls for a piece of soft wood, preferably pine, 10" wide, 14" long, ½" material. If a ten inch board is not at hand, two pieces must be jointed and glued-up to size. A quarter inch chamfer is planed around the edge, and two holes are bored for holding the piece in place, as shown. After sanding, the board may be stained a soft tone of green or brown. Attach two right-angle screw hooks, as shown on the drawing.



DETAILS OF TENT BULLETIN.

Punch holes in the paper and hold it in place with a stout rubber band.

Oar Lock Holder

Every tent should keep rowing equipment shipshape. A simple arrangement for holding the oar locks is shown in the next drawing. It means a place for the oar locks and they should always be returned to the holder after using.

The piece of wood should be cut from a scrap of ⅞" material, 1¾" by 8". A shoulder is cut on either end, one inch from the ends and half way through. Round the corners slightly as shown. Screw holes are bored one-half inch from the ends, and the holes for the oar locks are located 2½" from either end and bored with a ⅝" bit. Sand and stain, or paint.

Tent Oar Rests

After making the oar lock holders, we should next be interested in making a support for the oars, thus keeping them up out of the way on a very handy rest. Two rests are required, one to hold the handles and the other the blades.

Pieces A are made ⅞"x5"x14" and pieces B measure ⅞"x3"x24". Pieces A have a notch cut 2¾" from the ends and two inches deep. Before cutting these slots a four inch spike should be carefully driven in at points C for reinforcing these weak spots. Pieces B should be pointed at one end; at the other end, holes should be bored and countersunk for screws, at convenient places, to be attached to A. Screw the pieces together with 1¼" No. 10 flat head screws, taking pains to have the pieces centered evenly and at right angles to each other.

The pieces to form the blade-rest are of similar construction; the slot, however, is 3" deep and ⅝" wide.

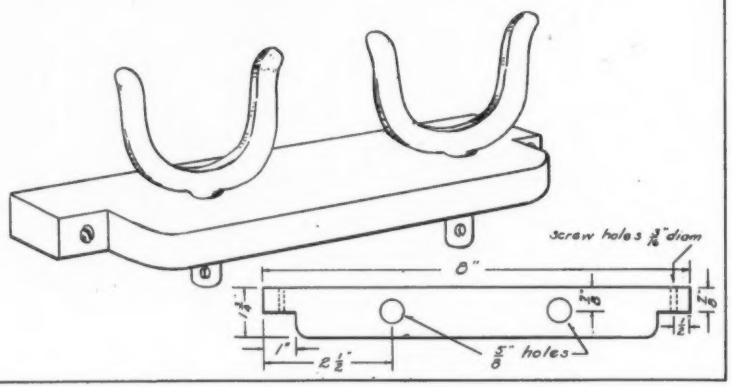
Paint green and when dry, add the tent number in white on the front end.

When driving in place in the ground, start the hole with a bar and place a block of wood on top of the rests to receive the mallet blows.

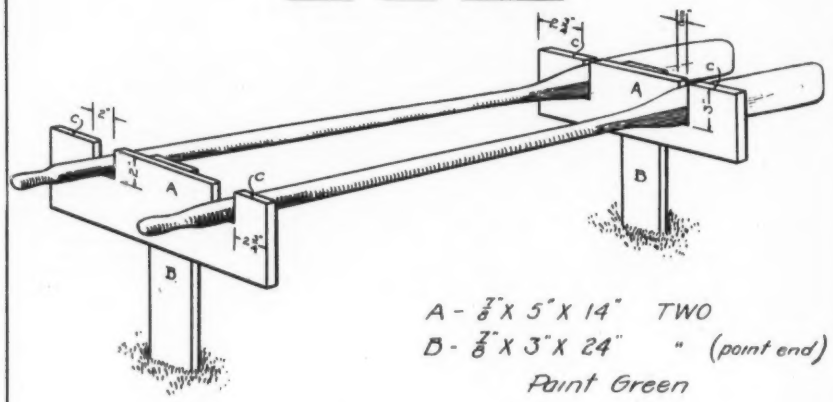
Supports for Mosquito Netting Frame

I have yet to find a camp that has not its quota of mosquitoes during the first two or three weeks in July. It is a wise camper who provides himself with six or seven feet of netting and some way of supporting the same.

OAR LOCK HOLDER

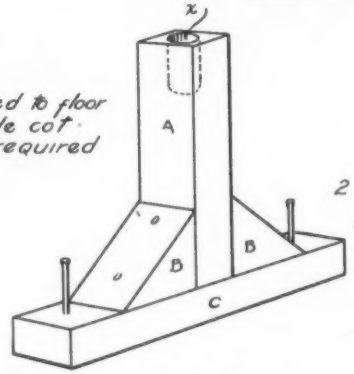


TENT OAR RESTS



A - 7/8" X 5" X 14" TWO
B - 7/8" X 3" X 24" " (point end)
Paint Green

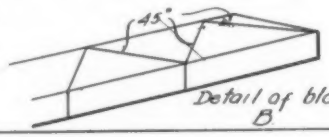
SUPPORTS FOR MOSQUITO NETTING FRAME



Nailed to floor beside cot. Four required

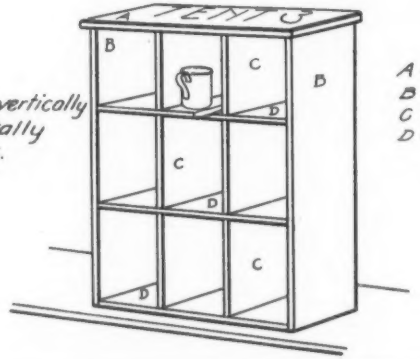
A - 7/8" X 1 1/2" X 13" - FOUR
B - 7/8" X (see detail) - EIGHT
C - 7/8" X 1 1/2" X 6 1/2" - FOUR
Paint brown or green

2 willow bows, trimmed and placed in hole X. 4 bows, 5' long



Detail of blocks B

CUP AND TOOTHBRUSH STAND

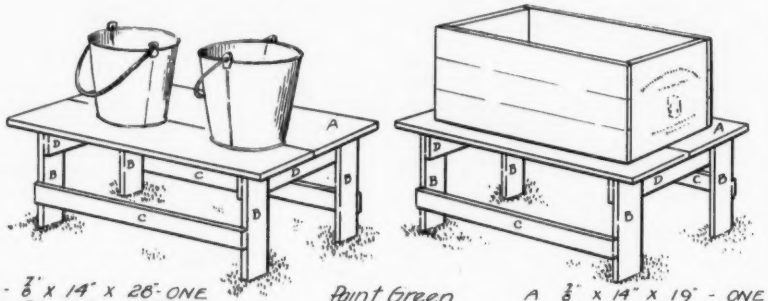


Divide box vertically and horizontally into thirds.

A - 3/4" X 6 3/4" X 18 1/2" - One
B - 1/2" X 6 1/2" X 21" - TWO
C - 1/2" X 6" X 6 1/2" - SIX
D - 1/2" X 6 1/2" X 16" - Three

Paint White

A PAIL AND A WASTE-BOX STAND

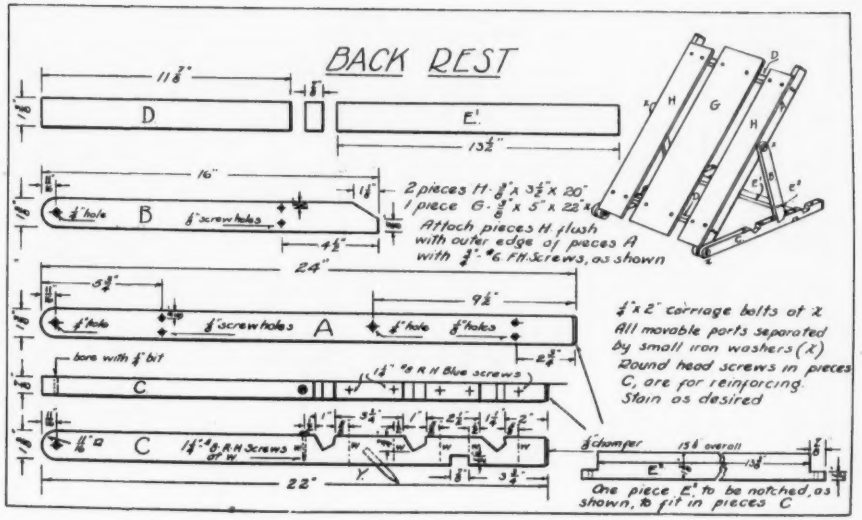


A - 7/8" X 14" X 28" - ONE
B - 7/8" X 3" X 13½" FOUR
C - 7/8" X 3" X 25" TWO
D - 7/8" X 3" X 12" TWO

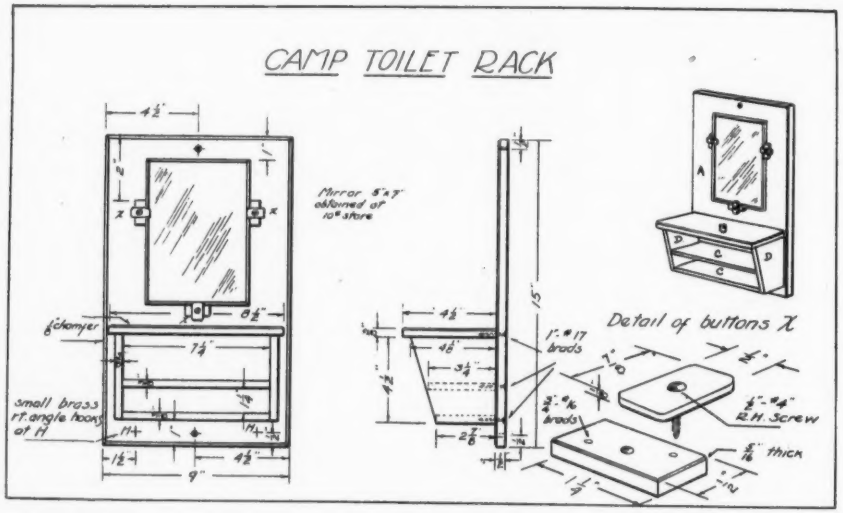
Paint Green

A 7/8" X 14" X 19" - ONE
B - 7/8" X 3" X 12" - FOUR
C - 7/8" X 3" X 17" - TWO
D 7/8" X 3 X 12" - TWO

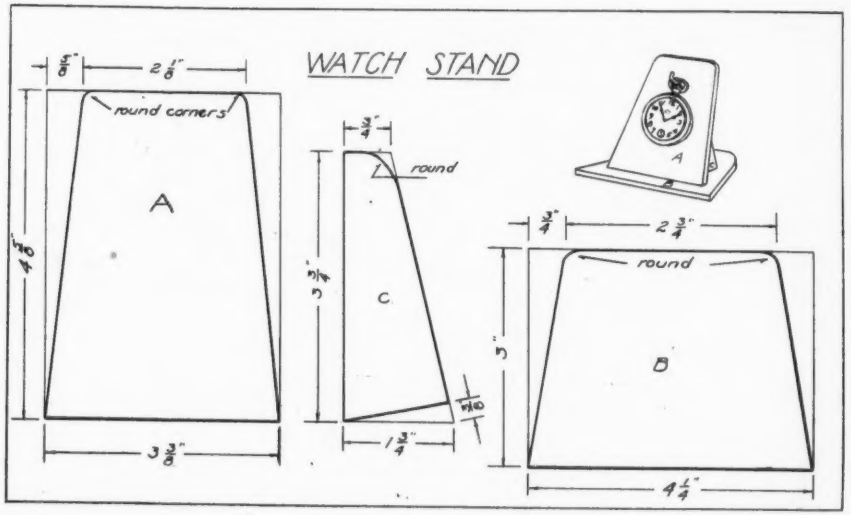
BACK REST

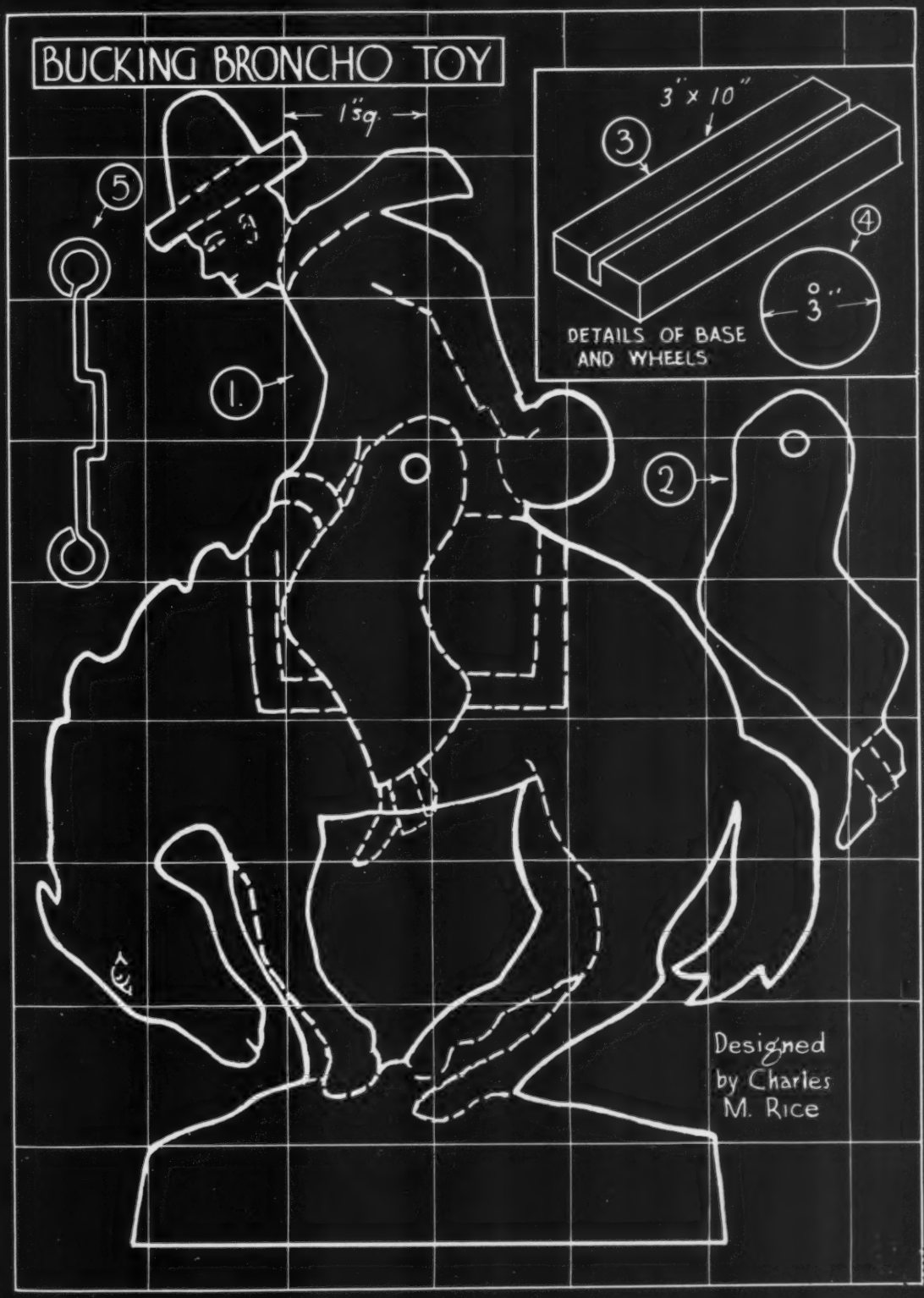

11⅞"
D
E'
13½"
16"
B
4½"
24"
A
9½"
C
22"
2 pieces H: ⅞" X 3½" X 20"
1 piece G: ⅞" X 5" X 22"
Attach pieces H flush with outer edge of pieces A with 3" #6 FH Screws, as shown
¼" x 2" carriage bolts at X
All movable parts separated by small iron washers (X)
Round head screws in pieces C, are for reinforcing.
Stain as desired
One piece E' to be notched, as shown, to fit in pieces C

CAMP TOILET RACK



WATCH STAND




BUCKING BRONCHO TOY
1" sq.
5
1
2
3" x 10"
3
4
3"
DETAILS OF BASE AND WHEELS
Designed by Charles M. Rice

BUCKING BRONCHO TOY

Charles M. Rice, Instructor of Manual Training, Everett, Washington

This toy reproduces the movements of a bucking broncho in a life-like manner. The swinging of the cowboy's legs adds to the illusion.

The horse and cowboy (1) are in one piece and sawed from 3-ply stock, 3/8" or 1/2" in thickness. The chaps (2), two of which are made, using the same material as used for the horse.

The base (3) is made from 1¼" stock and is made (3" x 10") three inches wide and ten inches long.

The wheels (4) are 3" in diameter and an 8/32" hole is bored in each wheel, one-half inch off center. The wheels are fastened to the base with 1¾" R. H. screws. The horse is fastened to the base and the legs are added to the rider, by using a piece of wire which is bent as in Fig. (5). The toy may be painted as desired.

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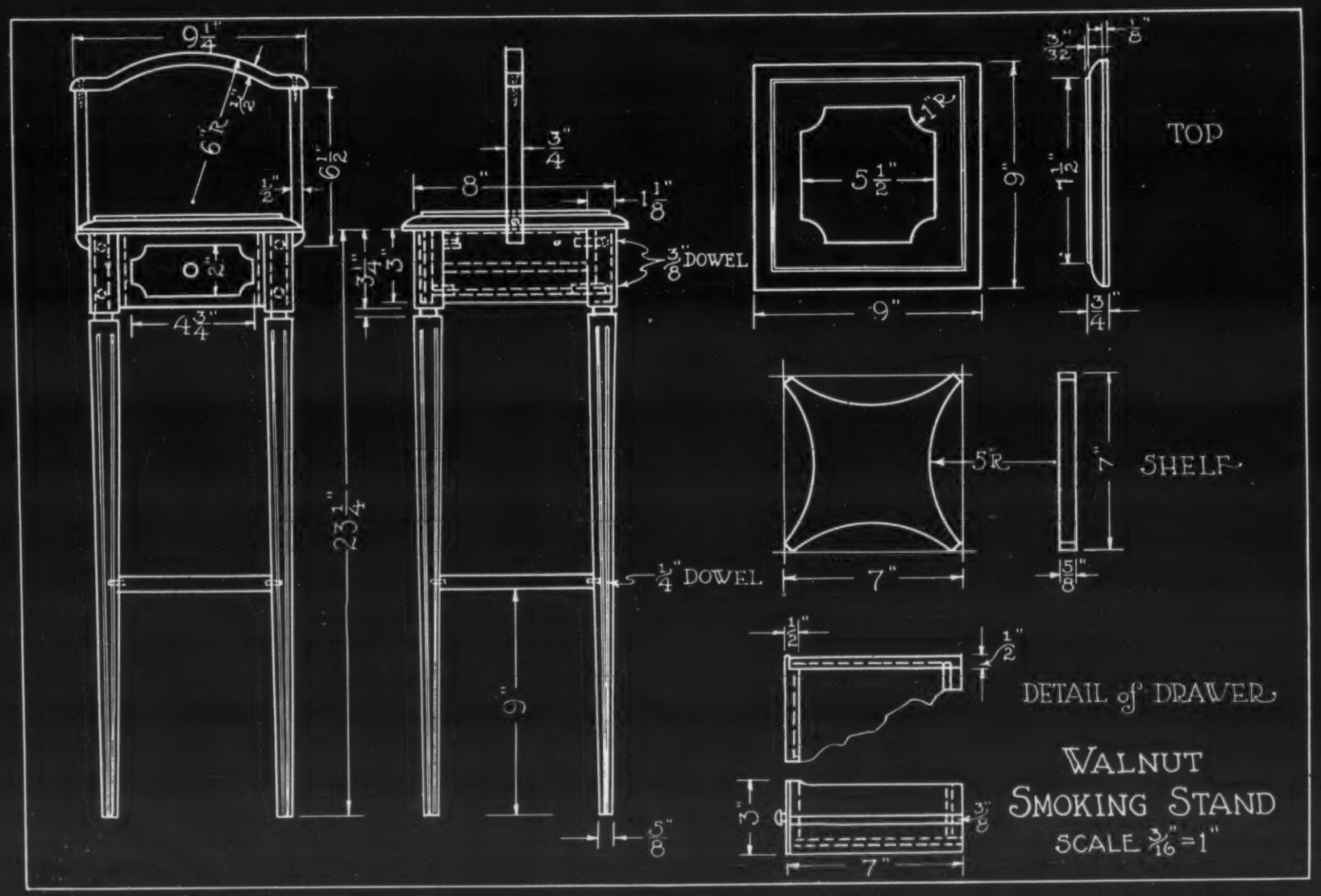
A simple method of extending the life of this sheet is to mount it on heavy cardboard or sheet metal and give it a light coat of shellac.


9 1/4"
6"R
3 1/2"
6 1/2"
1/2"
8"
3/4"
1 1/8"
3/8" DOWEL
3 1/4"
3"
4 3/4"
23 1/4"
9"
1/4" DOWEL
5/8"
1"R
5 1/2"
9"
9"
3/32"
1/8"
7 1/2"
3/4"
TOP
5"R
7"
SHELF
7"
5/8"
1/2"
1/2"
DETAIL of DRAWER
3"
3/8"
7"
WALNUT
SMOKING STAND
SCALE 3/16"=1"

A TWO-TONE WALNUT SMOKING STAND

Francis E. Joas, San Antonio, Texas

There are a number of points through which we can justify manual training, from general educational values down the line to the actual projects of value. Now then, if the projects we make have a justifying value it behooves manual training instructors to wake up and keep abreast of the times. The pieces of furniture made and turned out of the manual training shops today are in most cases, the same as those turned out ten or fifteen years ago, and the type and style of furniture found in a furniture store and home of fair circumstances today is of a different caliber. The clumsy, awkward mission type is rather far-fetched and remote from the classic and periodic styles now in vogue, with their grace of design and beautiful finish. To sum it all up in a few words, we are falling down on the job. It is, therefore, with this idea that I am submitting this smoking stand whose design, I think is quite good; although simple, it can be made in any shop where a power circle saw can be found. It should be made preferably of black walnut. Gumwood will do well enough.

The fluting in the four legs $\frac{1}{16}$" deep and $\frac{1}{8}$" across can very easily be done on a circle saw and then finished out by sanding. The moulding design of the top can be first chamfered and then the raised panel effect gotten by running on the circle saw. For routing out the design on the top and drawer front, the tang of an old file ground to a point, works very well. This groove is necessary to keep the stain from running and for separating light and dark fillers. The top is best fastened on by the use of four angle irons about $\frac{1}{2}$" long and either arm being $\frac{3}{4}$". The drawer has grooves cut in each side, to slide on a corresponding slide rail fitted on the rails. The shelf is put in by gaining across the legs at 45° and using a $\frac{1}{4}$" dowel joint. Best results will be obtained by finishing each piece, and completely sanding, ready for the finish before assembling. All should then be assembled for finishing, with the exception of the handle and supports, which are later fastened on with $1\frac{1}{4}$" No. 7 flat head brass screws.

For finishing, use a dark walnut water stain. This will require sponging first with pure water to raise the grain, and should then be sanded up smooth when dry. For the light colored panels in the drawer front and top, thin the stain to the desired shade. Fill with paste fillers, of correct shade and finish, with two coats of prepared furniture wax.

This project will be found a thing of beauty and may well grace the living room or den of any home. It is not beyond the ability of the average high school boy.

Bill of Material for Smoking Stand Finished Sizes

4 pcs. $1\frac{1}{8}$"x$1\frac{1}{8}$"—$23\frac{1}{4}$" Legs
3 pcs. $\frac{3}{4}$"x3"—$5\frac{3}{4}$" Rails
1 pc. $\frac{5}{8}$"x3"—$5\frac{3}{4}$" Drawer Front
1 pc. $\frac{3}{4}$"x9"—9" Top
1 pc. $\frac{3}{4}$"x7"—7" Shelf
1 pc. $\frac{3}{4}$"x$2\frac{1}{2}$"—$9\frac{1}{4}$" To saw out handle
2 pcs. $\frac{1}{2}$"x$\frac{3}{4}$"—$4\frac{1}{2}$" Handle Supports
2 pcs. $\frac{1}{2}$"x3"—$6\frac{7}{8}$" Drawer Sides
1 pc. $\frac{3}{8}$"x$5\frac{1}{2}$"—$6\frac{3}{4}$" Drawer Bottom
1 pc. $\frac{3}{8}$"x$2\frac{3}{8}$"—$5\frac{1}{2}$" Drawer Back
2 pcs. $\frac{1}{2}$"x$\frac{1}{2}$"—$5\frac{3}{4}$" Drawer Slides
1 $\frac{1}{2}$" Drawer Pull
3 $\frac{1}{2}$"x$\frac{3}{4}$" Angle Irons

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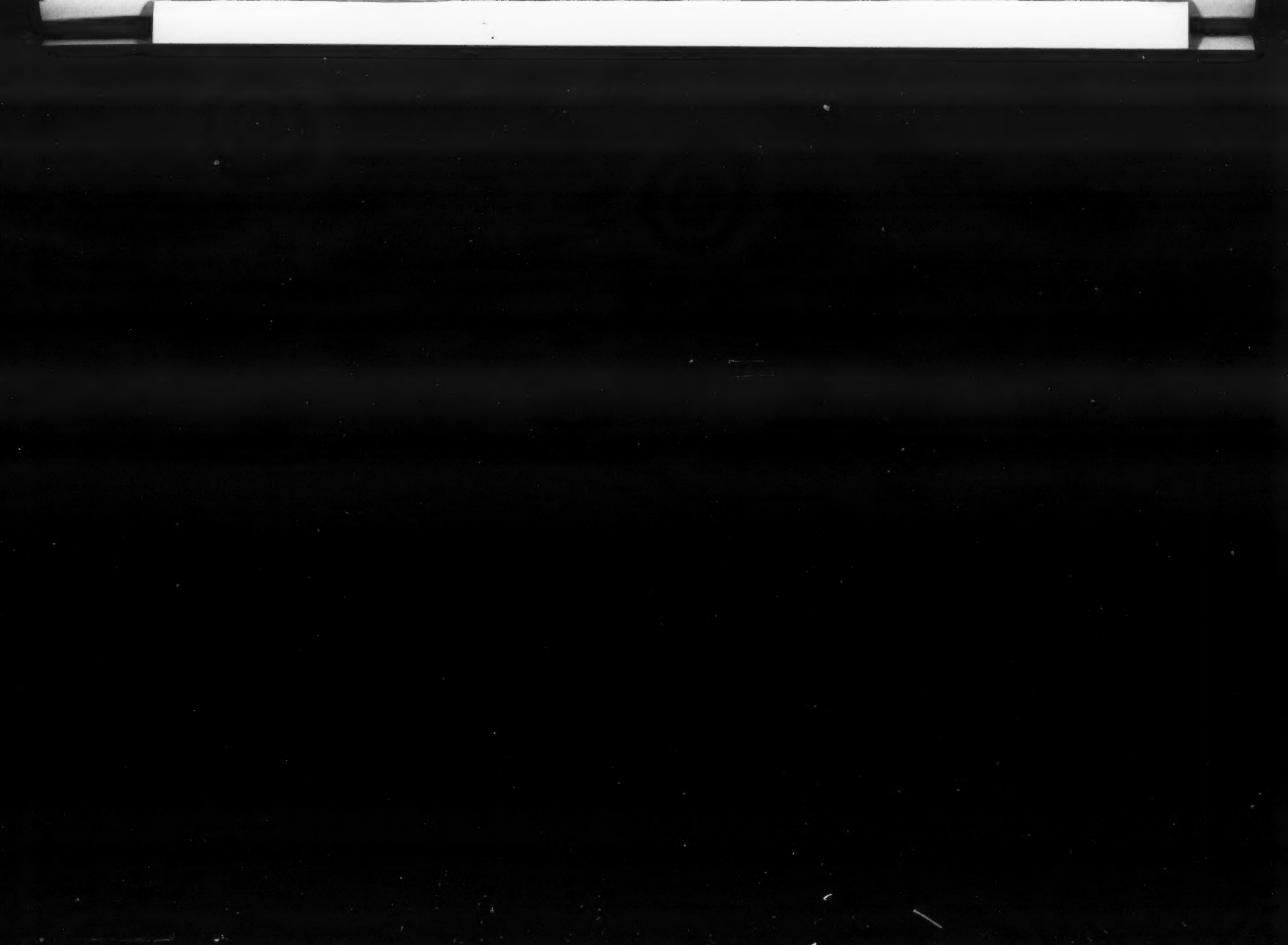


These supports are nailed or screwed to the tent floor, close to the head and foot of the cots, (single cots) and a pair of smooth, straight willow wands are placed in the holes in the uprights. The netting is draped over these wands. Every morning the netting should be carefully folded and placed beneath the pillow, and the wands taken from the supports and neatly placed beneath the cots.

Piece A is made 7/8"x1½"x13", and a hole is bored in the top of a size to just receive the wand. Pieces B are cut as shown in the detail, and piece C is made 7/8"x1½"x6½". Assemble as shown and paint or stain to suit individual taste.

Four of these should be made; but two can be used by placing them at the head end of the cot and draping the netting over the foot.

Cup and Toothbrush Stand

A toilet case where all toilet articles may be neatly kept, is quite a camp necessity. It obviates any excuse for carelessness in handling small things, such as combs, toothbrushes, soap boxes, and tooth paste which easily get mislaid. The toilet box shown is quite simple in construction and is made as follows: Piece A is made of ¾" material, 6" wide and 18½" long. It has a quarter inch chamfer planed on the front and two ends. The two sides B are ½"x6½"x21" and the three shelves D are ½"x6"½x16". The six partitions C are ½"x6"x6½".

Assemble the pieces with 1¼" No. 15 brads. Care should be taken that the partitions C are flush with the front edge of the shelves D, and the top A is flush with the sides on the back edge and projects at the front and two ends. The back should be made of ½" thick pieces of wood or a piece of wall board which can be cut in one piece to fit. Paint the entire cabinet white and letter the tent number neatly on the top.

A Pail and Waste Box Stand

A stand at the front of the tent for the water pails and one in the rear for the waste paper box tend to neatness and orderliness in camp. The pieces are cut to the various sizes shown in the stock list and can be made from a packing case.

After cutting all pieces carefully to size, assemble with nails or screws. Pieces C are attached 3½" from the bottom edge of the legs. Paint any desired appropriate color.

Checker Table

A handy game table is a very important part in the rainy day program of the camp.

The top of the table is made of 7/8" material, 20" square. As it is to be covered with oil cloth, it may be made up of three or four pieces placed closely together and nailed to side rails C. The four legs are 1¾"x1¾"x26". If no wood of this thickness is at hand, two strips 7/8" thick, 1¾" wide, and 26" long may be easily nailed together. The two side rails C are 7/8"x4"x17¾", and the two rails B are 7/8"x4"x16". Sand and assemble by nailing the rails together first with 8-penny nails; then attach the legs by means of 1½" No. 10 round head blue screws. Attach the top and cover it with white oil cloth. Lay out the checker field in two inch squares and make the border two inches wide. Paint the alternate square black. Stain woodwork to suit taste.

Watch Stand

This problem is a convenience in camp and a worth while souvenir to take home. Watches are often carelessly handled in camp, but this little article placed on the owner's trunk by the cot, insures safety for the timepiece and keeps the watch within easy view of its owner.

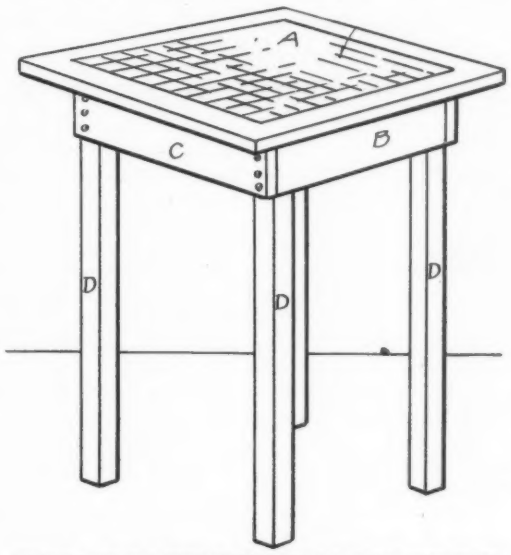
Piece A is made ½"x3⅜"x4⅝" at first. On one end measure in 5/8" from the corner and draw lines to the corresponding opposite corner. Plane to this line and round the two upper corners slightly.

Piece B is ½"x3"x4¼" and, after cutting to this size, measure in ¾", and draw lines as shown in the drawing. Plane to this line and round slightly as indicated.

Piece C is cut ½"x1¾"x3¾", and a line is drawn from a point ¾" from one corner to the opposite lower corner. Measure 3/8" from this corner and draw a line as shown. Saw and plane to these lines.

Place piece A against piece C to mark the bevel to be planed on piece A, to make it conform to the lower end of C. Plane the necessary bevel.

Sand carefully and assemble all parts with glue and 1" No. 17 brads. Stain as desired and place a screw hook to hold the watch in place. The camp name and year may be lettered just below where the watch hangs.



DETAILS OF CHECKER TABLE. WHITE OILCLOTH WITH SQUARES PAINTED IN BLACK.

Camp Toilet Rack

The next article is an especially fine one for a boy to make for his councillor's convenience. It provides a looking glass and two shelves to hold soap box, comb, toothpaste, shaving cream, razor, and other toilet necessities. The mirror is a product of the dime store and is held in place by three wood buttons.

The back piece A is made ½"x9"x15" and has a 1/8" chamfer planed on the edge. The necessary holes for hanging up are bored at the top and bottom, as shown. Piece B is made ½"x4½"x8½", with a 1/8" chamfer planed on front and both ends. The two shelves, C, are 3/8"x3¼"x7¼" and 3/8"x2⅞"x7¼" respectively. Sides D are 3/8"x4⅛"x4½", cut so as to taper to 2⅞", as indicated.

Sand all pieces and assemble with glue and 1" No. 17 brads. Attach the shelves to the back board, an inch up from the lower edge and equally spaced from left to right.

Make buttons as shown in the detail and bore a hole in the movable part to receive a ½" No. 4 r. h. screw. Attach the three pieces at the points indicated, with glue and ¾" No. 16 brads. Screw the top part of the buttons in place.

Paint white or stain to suit.

Back Rest

The back rest is a very useful and comfortable article to have at the evening camp fire or any out-door gathering. It has three adjustments and may be folded compactly for carrying. The rest is also suitable for use in a canoe and may be taken home for use in the sick room.

Make the back rest of 7/8" pine as follows:

Two pieces, C, 7/8"x1 3/8"x22". Round one end and slightly chamfer the other for a finish.

Cut the slot W W to receive the shoulder cut in the cross brace E. Before cutting the other retaining notches, make up the other pieces.

The two pieces A are now made 7/8"x1 3/8"x24", rounded and chamfered the same as pieces C. Two braces B are next made 7/8"x1 3/8"x16", with one end rounded and the other end cut as shown in the drawing.

Cut brace D 7/8"x1 3/8"x11 7/8" and braces E^1 and E^2 7/8"x1 3/8"x13 1/2" and 7/8"x1 3/8"x15 1/8" respectively.

Cut shoulders at both ends of brace E^2 in the manner shown.

Bore all holes for bolts with a 1/4" bit at the places indicated. Bore all holes for screws where necessary.

Sand and temporarily assemble, using small iron washers between moving parts and under nut of bolt. This assembly is to ascertain just the required angle to cut the three notches in pieces C. The notches should be spaced as shown in drawing.

After the notches are marked, the necessary reinforcing screws (1 1/4" No. 8 r. h. blue) at W should be screwed in place before any cutting of the notches is done. Be sure the notches are not over 3/4" deep.

Cut two back slats, H, 3/8"x3 1/2"x20" and a middle slat, C, 3/8"x5"x22". Bore screw holes where necessary.

Sand all parts and stain. Assemble permanently.

To insure the back rest from slipping when leaned against, half inch holes should be bored at point Y, in the lower edges of pieces C and half inch wooden pegs inserted and pointed as shown.

Finish as desired.

The General Shop in the Junior High School

Denman Kelley

(Concluded from June)

ANOTHER form of general shop organization, where the equipment is all in one room, has been advocated as a method of solving the class organization and administration problem. This is a combination of the shop rotation plan with the plan just discussed under the General Activity Shop. Under this plan, the twenty students which one teacher would have, as illustrated, might be divided into, say, five groups of four each. If the shop was organized for the teaching of work in woodwork, pattern-making, drafting, electricity, forging and foundry, sheet metal, machine shop and plumbing activities, some such procedure as outlined here could be used.

The five groups would be lettered A, B, C, D, E.

	7th Year		8th Year		9th Year	
1. Drafting	A	B	C	D	E	2 hrs. per week
2. Woodwork	A	..	E	D	B	C
3. Pattern-making	..	A	B	..	C	D
4. Electricity	B	..	A	..	E	..
5. Forging and foundry	C	B	D	A	..	E
6. Sheet metal	D	C	..	E	A	..
7. Machine shop	..	E	C	B	D	A
8. Plumbing	E	D	..	C	..	B

Group A would have 1, 2, 3, 4, 5, 6, 7.
Group B would have 2, 3, 4, 5, 7, 8.
Group C would have 2, 3, 5, 6, 7, 8.
Group D would have 2, 3, 5, 6, 7, 8.
Group E would have 2, 4, 5, 6, 7, 8.

Any other combination could be used instead of this as it seems desirable all students would have drafting one or two hours per week in a single class, the work being correlated with the shop work of the students.

While this plan is workable, it is not a general activity shop in the real sense of the word, but is just another form of shop rotation. There could be very little overlapping of projects; each subject would have to be complete in itself. It would have the same advantages as the shop rotation plan insofar as the organization of subject matter is concerned, but there would be the disadvantage of the teacher conducting five different classes of four each, in five different subjects, at the same time. Of course this disadvantage could be partly overcome by the individual group-instruction plan. By a judicious organization of work from day to day the teacher could give approximately 20 to 25 minutes to each class each day. This could sometimes be given all at once in class instruction to a group while the other groups were at work; at other times the 20-25 minutes would be devoted to distributed supervision of the work of the group.

While this plan has several advantages and there is a tendency among teachers to try it, yet it lacks the important advantage of the general activity shop plan discussed last month, namely, the interest aroused through the environmental stimuli possible with the composite project.

Now let us look at the general activity shop plan from the viewpoint of realizing the primary and secondary aims of this period of education. Such a course would meet the exploratory aim very well indeed because the boy's work, covering a wide range of mechanical activities, being highly motivated would tend to arouse any latent interests in mechanical lines; interests which might never be discovered in the traditional shop courses.

It would give a broader view of industry and should give more appreciation, while the wide range of mechanical knowledge and experience ought to make for better home membership. While not giving as complete a training for any definite trade, it would give a general foundational training in mechanical knowledge and processes which should be as valuable as a more intensive training in a very few lines.

C. Shop Class Methods

Little need be said here as to methods for these have been rather fully treated in connection with the problems already discussed. However, certain terms that have been used rather frequently may need a little explanation.

1. Type of Work

(a) *Exercise.* The exercise method is one of the oldest of the organized teaching methods. It has been largely abandoned or modified so that it may be combined with some other method. The Russian system of manual training, used the exercise almost exclusively. There was no attempt to have the student make anything complete. The teaching content of the subject was analyzed and the operations and teaching principles were listed. Then exercises were divised to give practice in the principles and their application. As an illustration, the mortise-and-tenon joint in wood-working is one phase of the content of cabinet-making. The principles involved in the use of the mortise-and-tenon joint as used in cabinet construction can be taught by having the student make such joints out of scrap wood merely as exercises until he has acquired the necessary facilities in such an operation. Then, having acquired the necessary facility from the standpoint of instruction, it would be a waste of time to have him make a project involving them. It is the same principle as teaching a boy how to swim by exercises before he en-

ters the water. An amusing story is told of one boy who had been so taught and was asked what he did when he entered the water the first time after the lessons were finished. "Sunk" was the reply.

This answer brings us to the principal objection to the exercise method when used alone. As a theory, it looks perfect but it does not secure results, mainly because there is no motivation. In the case of college students, there is sometimes the motivation produced by seeing a long deferred value, but very, very few junior, or even senior high school boys, are affected by this. There must be something to arouse the boy's interest and thus motivate him. Dewey says the child's interests, or in other words, the stimuli which cause him to act and to learn, arise from real needs in his life at the time. So in controlling environment the teacher must see that an immediate need is created for the thing he wishes the boy to do.

(b) *The Project.* So much has been said about the project during the last few years that it is to be wondered whether any two writers have in mind exactly the same idea of a project. In using the term throughout this discussion I have meant to include any constructive or repair activity carried to its conclusion for which a real need had arisen in the life of the student. This would be entirely different from the exercise which has no end in view except the acquisition of knowledge and skill. In doing the project, the student's immediate aim is the finished project or activity; a product or activity for which his environment (controlled or natural) has brought about a need. It is true that one will work with no thought of the result, but from pure pleasure in the process itself when he works in a spirit of play, and this is the spirit that must be aroused if exercise work is to have any value. It is also true that the pleasure in the process is very short lived in play and the interest soon turns to something else. In the activity which is carried on for the sake of the result, as in the project, the interest in this result becomes such that the worker is willing and anxious to undergo the drudgery of the process in order to accomplish the result. This is the fundamental factor in deliberative thinking and action, the only kind of thinking which the school aims to encourage. If we can add to this a certain amount of pleasure in the process itself, due to anticipation of the desired result, feeling of power in achievement of something worth while and other similar reasons, we can do away with the drudgery of the process and so have pleasurable interest in both process and result, which is the highest form of educational achievement.

(c) *The Production Method.* There is one other method which is more widely used in vocational work than in prevocational. The production method has the advantage from the exploratory standpoint in giving the pupil a better idea of how the work of a particular trade is carried on under trade conditions. Let us take an illustration of its use in a school shop. Suppose the class decide to make a supply of ten tables for the primary department. The work of making the tables is analyzed into all the operations required. Suppose there are the operations which can be carried on simultaneously at the start. Two boys could be placed on each of these operations. For one period the boys would work in this order. The next period each team of boys would advance one operation and so on until these ten operations were complete. Then, suppose the next set of operations which could be done simultaneously were ready to start. Suppose there were five of these operations, including finishing. There would be five groups of four boys each who would work on these operations, advancing period by period as before, until as nearly as possible each group had had some experience on each operation unit.

This is a very vague and unsatisfactory illustration, due to lack of space; there are many complexities entering in, which cannot be discussed here. The individual teacher must analyze his orders, and arrange his factory just as the factory manager and efficiency engineer do. The teacher would have only the additional task of arranging the class so that the boys advance from operation to operation, thus avoiding specialization in which each boy works on only one operation, yet at the same time using the factory specialized system of production. Another disadvantage is the fact that a boy would only work on any particular operation until he began to acquire a reasonable skill, when he would be transferred to a new one where he would have to begin learning something else. An advantage over the project method would be that a boy would do each operation several times instead of only a few times.

As to the interest factor, it is safe to say that it will be high, so long as the idea of a play factory has its appeal. Like all play which finds its allurement in the process rather than the result, this allurement soon dies out as the process loses its novelty and there is nothing to take its place. The production method is well worth trying occasionally in the general shop of any sort, but it should be confined to short, intensive periods lasting only a few weeks until the novelty has worn off.

D. Teachers for General Shop

1. *Characteristics necessary.* For the general shop of any of these types—(a) home mechanics, (b) farm mechanics, (c) general activity shop—it is necessary to have a type of teacher who is at present very rare. To begin with he should have unlimited resourcefulness, initiative, and enthusiasm. Otherwise he will fail because there is at present no fixed standard; no outline of the course he must follow and it is doubtful whether there ever can be. The general shop teacher must constantly be a pioneer in the field of prevocational work.

Such a teacher must, of necessity, have a broad mechanical training, with ability to acquire more in any field as the occasion demands. In addition, he must be an expert in the technique of class organization and teaching.

The best place to secure such a training is probably a teacher-training institution maintaining a wide variety of shop courses. Such institution as Stout, Bradley, Indiana State Normal School, Kansas State Normal at Pittsburg, and many others offer courses supplying the necessary training. It is scarcely possible to offer the wide range of training necessary for teachers of the general activity shop plan. Its objectives are two; (a) to give information and skill in a wide range of subject matter, and (b) to offer training in the technique of teaching. While the training of general shop teachers is still in the experimental stage, it is probable that a fairly wide range of shop courses, with specialization in a fundamental one around which the others are grouped—such as woodworking or machine shop—would be the best training for subject matter.

Conclusions and Recommendations

Very little need be said in the way of conclusion as most of the conclusions have been drawn in connection

with the discussion. A few brief summaries may serve to clarify the discussion.

1. The general shop realizes more completely a greater part of the objectives of secondary education, especially for the junior high school boy than any other form of shop work. Its disadvantages are that it is still in the experimental stage, without standards and clear-cut understanding of terms. It offers administrative difficulties not met by the existing forms of procedure, but which can be met by teachers with sufficient initiative and resourcefulness.

2. For rural communities a flexible course in farm mechanics combined with the work in argriculture is probably the best form of general shop.

3. For towns, small cities, and in many cases for larger city junior high schools, the general activity shop meets the needs of the situation better than any other type. Home mechanics is good, but the course should be broader than merely home mechanics, much of which can well be included in the activities experienced.

4. For large school systems the shop rotation plan is likely to be more satisfactory than any of the others.

5. There are many dangers to be avoided in establishing and conducting a general shop system. Undue enthusiasm should not lead an educator to claim too much for the plan. It is still experimental and cannot be standardized for some time. There is danger of selecting the wrong teacher, or of tying a teacher's hands by administrative misunderstanding. There is danger of a teacher's enthusiasm dying out after the first few months, with the work falling into a routine, dispirited type of activity worse than the types of shop work it is intended to remedy.

AN ATTRACTIVE WALL DECORATION

R. E. McKenney, Jackson, Minnesota

Picture appreciation, as well as the art of interior decoration, are involved in the project here suggested. These two elements should be briefly considered before proceeding with the definite working out of the project. In the progressive school the student has developed a general appreciation of good pictures. If this has not been the case, the instructor should conduct two or three well-planned lectures, with illustrations and examples to show what kind of pictures should be selected for the various rooms. For example, scenes of war, famine, etc., would not be appropriate to a dining room. Appropriateness should be considered first. Then the proper place of hanging, color scheme, furniture, hangings, and the like should be stressed before any attempt is made to select pictures. Otherwise the student will choose the picture

SOME PICTURE FRAMES, PLACQUES, AND BOXES MADE BY THE AUTHOR'S CLASS.

OBJECTS MADE AND DECORATED BY THE AUTHOR'S STUDENTS.

for its own sake, rather than for the sake of its appropriateness, or its relation to decoration (its relation to other objects, colors, hangings, etc., in the room).

Having considered appropriateness, pupils should be given a good understanding of the basic principles of good decoration (unity, emphasis, balance, etc.). It is well at this point to have the pupils search out ten to twenty pictures from magazine covers, illustrations, or colored photographs. If the class is not too large, it is an excellent plan to go to the home of each pupil and with him study the pictures therein to help him decide which of his ten or more pictures is the best for his own surroundings. It should be made clear that what might be suitable in one case would not necessarily be acceptable in another.

The steps in the making of this project are shown by means of a number of small drawings and sketches numbered from 1 to 9 inclusive.

Step 1. After selecting the picture, the student designs the frame. In doing this it is best to determine approximately the size of the frame wanted, and block it out upon a sheet of squared paper. The paper should be folded along its perpendicular center, and a tentative pencil outline sketched on the remaining one-half of the folded squared sheet.

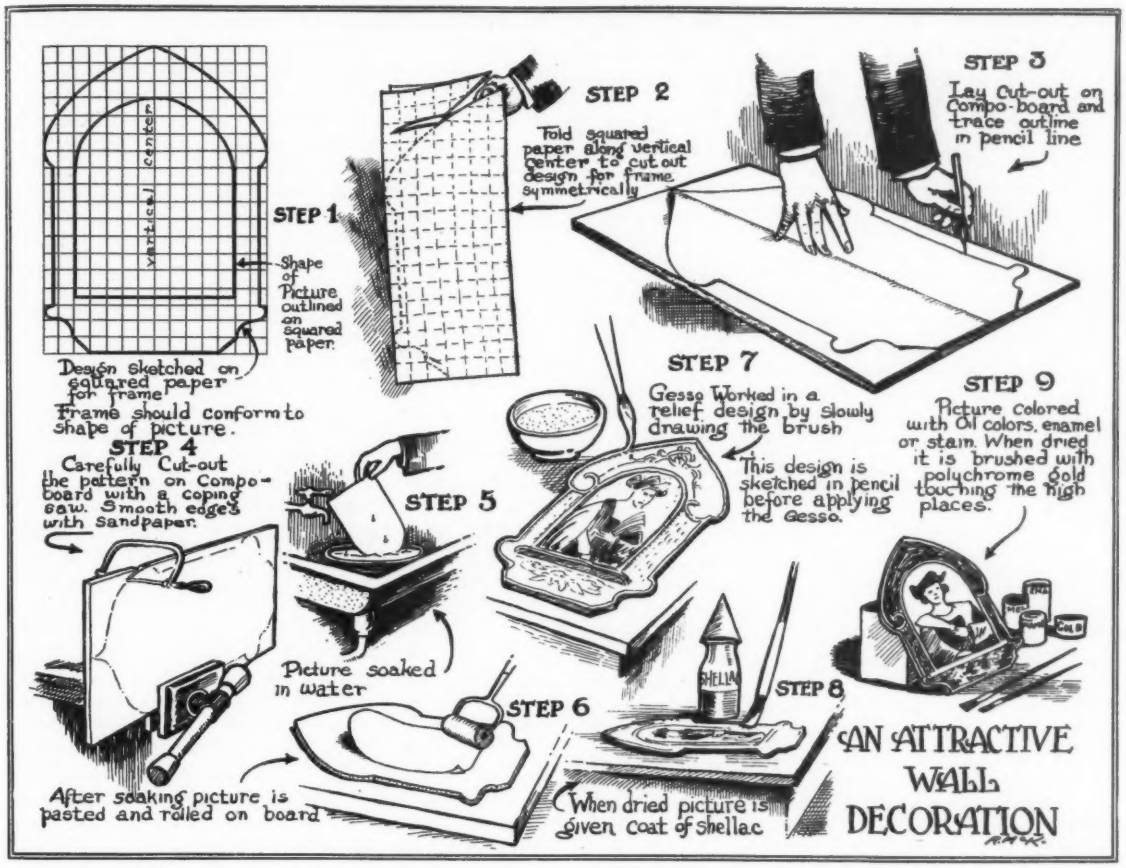
Step 2. With the squared sheet folded carefully along the vertical center, cut out the design so that both sides will be symmetrical when unfolded. If this design is not harmonious with the shape into which it is to fit, or with the furniture and hangings of the room, try Step 1 again until it meets the requirements of good design.

Step 3. Trace the design upon compo board.

Step 4. Carefully cut out the shape of the frame with a coping saw.

Step 5. Soak the picture in water two or three minutes so that when mounted on compo board it will not dry wrinkled.

Step 6. With a small roller, fix the picture in its proper position upon the board, having first applied a thin film of paste on the under surface of the picture.


STEP 1
Shape of Picture outlined on squared paper.
Design sketched on squared paper for frame.
Frame should conform to shape of picture.
STEP 2
Fold squared paper along vertical center to cut out design for frame symmetrically
STEP 3
Lay Cut-out on Compo-board and trace outline in pencil line
STEP 4
Carefully Cut-out the pattern on Compo-board with a coping saw. Smooth edges with sandpaper.
STEP 5
Picture soaked in water
STEP 6
After soaking picture is pasted and rolled on board
STEP 7
Gesso Worked in a relief design by slowly drawing the brush
This design is sketched in pencil before applying the Gesso.
STEP 8
When dried picture is given coat of shellac
STEP 9
Picture colored with Oil colors, enamel or stain. When dried it is brushed with polychrome gold touching the high places.
AN ATTRACTIVE WALL DECORATION

Step 7. Using Gesso, carefully work out the design in harmony with the elements suggested in Step 1. The design is sketched in pencil before applying the Gesso.

Step 8. After drying for 24 hours, the Gesso design is shellaced. Also shellac the back of the compo board to avoid warping.

Step 9. Select an oil color of dulled finish harmonizing with the predominating colors of the picture. Brush thinly over the frame. When this coat has dried, touch up the high places in the design with a bright color, or with one that is dominant in the picture, or use harmonious polychrome gold. Deep Roman gold has been found most satisfactory for most of this work in the Jackson (Minnesota) schools. Statuary brown and antique have also been used with much success.

MECHANICAL DRAWING AS A REQUIREMENT FOR HIGH SCHOOL GRADUATION

John Homewood, Ontario, California

We convey our thoughts to others through the medium of speech, writing, and drawings. Speech and writing become inadequate to express subjects of a complex nature; therefore, we resort to graphic delineations in the form of pictures.

The student in mechanical drawing is trained to visualize. From the fundamental problem of a point, suspended in space and being in a certain relation to horizontal and vertical plans, to the more complicated forms, he is trained to express their form and sizes in a way that another may understand. Through the medium of mechanical drawing one's vision may be transferred to another. Although that other person cannot speak our language, he can, to a considerable extent, interpret our meaning. The progress of our civilization has made it necessary that all be trained in the art.

Visualization has been the guiding factor in the progress of the past. Great sculptors "saw," within the great masses of marble, the beautiful faces and forms that now adorn our galleries. Architects "saw" great cathedrals standing amid beautiful surroundings long before other eyes beheld the works of their great vision. Spanning great turbulent rivers, engineers have "seen" massive steel bridges that enable us to ride with contempt over the raging torrents below. Floating palaces, that now cross the great expanse of waters, were at one time but day dreams of the designers. The artist "sees" his picture long before the brush touches the canvas.

It is the power to visualize that gives birth to all great undertakings. Who knows what great masterpieces are now hidden in the minds of today? Our buildings may seem like small dwellings compared with some now "resting" in the minds of our far-seeing architects. Our present day aeroplanes, that only a short while ago held us in awe, will seem like sparrows flitting around the mechanical condors of tomorrow. Such is the power of visualization.

That power to visualize, and to interpret the thoughts of others, should be instilled within each child of today. We have progressed through the past because others "saw" and transferred their visions to others for interpretation through the medium of mechanical drawing. Therefore, I claim that the power to visualize should be developed in each child, and for that reason mechanical drawing should be a necessary requirement for graduation from high school.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

THE INFORMATIONAL SIDE OF THE INDUSTRIAL ARTS

The industrial arts workshop is a laboratory. As a laboratory, it is a place where information is sought, where principles are tested, and where conclusions are reached and verified. It is not specifically a place for acquiring mechanical skill, although some skill must inevitably result from proper conduct in any laboratory.

Almost hourly in modern life, the individual has occasion to call to his assistance his reserve knowledge of industrial mechanisms and of the principles underlying the very devices upon which he depends for his life and his comfort. In spite of this fact, how densely ignorant the general public is with reference to such matters! The necessity is not usually for the employment of great skill in the application of such principles. And yet such skill as always accompanies good industrial arts work meets frequent and very important demands in every walk of life.

The enthusiasm for a variety of shop and industrial experiences for every boy who goes through the public schools, is more manifest now than ever before among the really constructive thinkers of the educational world.

A few of our erstwhile leaders have done what little they could to discredit general industrial arts courses in the schools. This was due to a misguided zeal for vocational education. Our leaders, let us hope, may some time achieve the feat of entertaining two ideas at the same time, especially when those ideas are not in conflict but are in reality parts of the same unified system.

The more industrial arts work the better. The more the industrial arts shop becomes a real laboratory for general information and for the testing of principles the better. The more industrial arts teachers inform themselves concerning the big, general problem of the education of young people for life in a democracy the better it will be for them, for those they teach and for the country.

BOYS' BOOKS IN SCHOOL LIBRARIES

In a recent discussion of conditions in Minnesota with reference to the manual and industrial arts work of the schools, Mr. Homer J. Smith made some rather startling revelations. One that should startle every friend of the shop courses in the public schools is the fact that investigation showed that the school libraries of Minnesota contain practically five times as many books dealing with girls' work as those devoted to boys' work. A number of reasons were suggested for this condition, one of the main ones being that much fewer requests were made for such books and much less interest is manifested by the teachers of shop courses for books dealing with boys' work.

The charge is continually made that the manual, industrial, and vocational teachers in general do not read. If this is true, it is the most serious charge that can be brought against such teachers. If it is true, the reason for the Minnesota condition is obvious. It is also probably fair to assume that the condition found in the Minnesota school libraries is typical of the conditions existing in other states.

It is fair to assume that those who have the responsibility of purchasing books for school libraries would as gladly add books dealing with boys' work as those concerned with the work of girls. All that is needed is to provide such people with selected lists of books bearing on industrial enterprises, mechanical constructions, occupational opportunities, biographical information concerning successful men in the various fields of work, etc.

Teachers are seriously remiss in their duties unless they provide the librarians or other authorities with adequate and well selected lists of desirable books along these various lines. A critical and discouraging condition has been revealed. Teachers and pupils need to read books and good periodicals. We have abundant faith that the teachers will rally to the cause and put on regular intensive book drives and that they will make it possible for the boys to have access to the very best books on the market.

PUBLICITY FOR INDUSTRIAL ARTS COURSES

A Pennsylvania teacher has sent us a series of six news articles taken from the papers in that community where he has been working during the past five years. The articles appeared during the months of March, April, and May of the present year. Two of them were abstracts of a paper with a local slant, which he had written for a professional magazine, another was a column account of a shop exhibit that had attracted favorable notice. The remaining articles discussed the work carried on in the teacher's shops and were largely in the nature of interviews explaining the courses, aims, and results attained. Each one of the articles was informational, newsy, and of interest, and undoubtedly contributed toward selling the idea of industrial arts and vocational education to that community.

Every shop teacher has a distinct duty to interpret education to the public in the community where he works. Most instructors are too modest to do so in more than their ordinary contact with neighbors and friends, and patrons of the schools. But there is nothing selfish or improper for every shop teacher to seek all the publicity possible, within reasonable limits, for the schools and for the particular phase of the work he is doing. That publicity may take the form of exhibits, or public addresses, or newspaper articles. The case of the Pennsylvania teacher just cited illustrates what may be done in one direction.

The cause of industrial arts and of vocational education would be immeasurably promoted in the cities and towns if every supervisor and every teacher made it a point to keep the public fully informed of the high spots in their work. The best insurance against criticism and ignorant opposition is ample publicity.

WHY MANUAL ARTS FAILS TO PROGRESS MORE RAPIDLY

The latest biennial report of the state superintendent of public instruction for Wisconsin contains a pertinent discussion on manual arts as a subject of instruction in high schools. The report makes clear that while the standards of teacher preparation and pupil achievement have risen during the past two years, there has been comparatively little progress in teaching materials, courses, or multiplication of activities. The difficulty seems to be that "boy product" is of secondary importance, while the material product is still rated first. Woodworking is still given too much attention as the *sine qua non*, and the problems of bringing the

boy into contact with other activities and other materials, and of doing work which can be carried over into life outside the school have been overlooked. The average boy can well cope with activities such as simple sheet metal work, hand work in metals, cement work, simple electrical work, and other activities. All of these lines of activity will broaden his economic outlook and make him appreciate to a fuller extent the interrelations among the world's greatest activities. Incidentally, these broader subjects have a direct vocational value which woodworking does not possess. The three difficulties barring the way of progress seem to be the teacher, the element of expense, and the lack of space. Both the expense and lack of room seem to be insufficient excuses, because they can be controlled and adjusted with comparatively little difficulty where the matter is thoroughly investigated. The teacher seems to be the most important of the three difficulties. Concerning the teacher the report says:

"A constructive program of any kind is futile unless the teaching force is prepared to carry it out and is in thorough sympathy with it, for after all it is the teacher who determines results. It is believed that essentially there are no mechanical problems in the suggestions made with which the well prepared teacher cannot cope. The method of attacking the problems and the organization of the newer teaching material may offer some difficulty, as this material has not been previously organized along the lines indicated. Possibly the paucity of such organization is an advantage in that new and fruitful experimental work will have to be undertaken and real progress therefore attained the more quickly. We must admit that careful experimentation will be necessary and it is hoped that teachers will bring to bear upon the problems the best there is in them and that they will be unbiased enough to recognize the validity of the claims made for innovations.

"It will also be necessary to overcome our conservatism; our teaching activities must partake of the nature of real investigation if we are to succeed. The problem method will entail a new attitude on the part of the teacher; he will have to be open minded and in a receptive mood in order fully to appreciate his problem. Class work as such will be minimized and his concern will of necessity be transferred from the material product to the "boy product" and it is well that such be the case. The former has always been too much in evidence and has seemed to be the aim.

"The teacher of the manual arts should do a great deal in the direction of professional advancement and almost of necessity must become a voracious reader if he is to be or remain at all familiar with the general education trends. This reading should not be confined to his special field but should include the fields of general education, literature, economics and contemporaneous social problems. Teachers are quite prone to become ultra-specialists and in the same measure limit their usefulness both as teachers and men of affairs. It must not be forgotten that the teaching of special subjects is amenable to the same principles governing education in general and that a broad training and wide outlook is necessary in order to see the various subjects in their true relation to the whole field of educational endeavor. Teachers should also be more generous in their attendance at educational institutions from time to time in order that they may come into direct contact with the more advanced educational thought."

TRAINING TEACHERS—AN ENGLISH VIEW

The Manchester Guardian, in its issue of May 29th, summarizes a recent report of a British committee on the "Training of Teachers for Public Elementary Schools," in which problems very similar to our own are discussed. The viewpoints coincide so closely to many American opinions that they are worth repeating:

"For many years now boys at school have been taught handicraft and there is no doubt that their interest in school has consequently increased. The old routine of learning was often a dreary business, with only an occasional drill to relieve its monotony. Trade unions had nothing to do with the necessity for calling in an artisan when a simple piece of, say, repair work had to be done. Incapacity on the part of pupils and masters was responsible. The fitting of a washer often demanded outside help. Handicraft to some of us who have long since passed out of school would have been a source of great delight. The present position regarding that subject is of interest to all concerned in the training of the young, and for that reason it will not be inappropriate to quote again from the report of the Departmental Committee on the 'Training of Teachers for Public Elementary Schools.'

"The importance of handicraft as an educational instrument in all the earlier stages of education is now universally recognized, the Committee state, but it is a comparatively recent subject in the curriculum of elementary schools. It came in by several channels, mainly two, through the influence of the kindergarten idea and in the wake of the arts and crafts movement which originated during the last quarter of the nineteenth century. Its importance has been increasingly recognized for twenty years, as the result partly of the theory that up to the age of adolescence the instincts of children incline to the practical side, and often fulfil themselves best in action, and partly to the desire for some counterweight to tendencies which might result in making elementary education too bookish. As it has been expressed 'Some form of handicraft is probably desirable at all stages of education; at the adolescent and immediately pre-adolescent stages it is absolutely essential for a balanced development. Children at this stage must have something to do, something to make, or something to destroy; and rightly directed this instinct may be made a valuable incentive to the study of the things they are using and the best ways of using them.'

"In the schools there are two ways in which handicraft may be regarded, the report continues, first as a means of illustration and of education through hand and eye, and second as a preliminary general training in craft skill, considered, however, as part of the educational process. In the first aspect, under the term handwork, it is a subject included in the training college course, and some ability in it is part of the normal equipment of elementary school teachers who have taken a course of training. In its second aspect, manifest in the instruction of the older boys as instruction in handicraft, it requires a greater measure of definite practical skill in woodwork or metalwork than the ordinary two-year course can be expected to give. In this way arises the need for teachers of handicraft as a special subject.

"There appears to be three types at present of handicraft teacher, corresponding to the following three possibilities respectively: (a) A craftsman can be brought into school with or without some experience or training in teaching his subject—a crude plan, but often more successful in fact than might be supposed, because it ensures a due sense of reality in the teaching; (b) a trained teacher, who has received some general instruction in handwork at the training college or has taken a course in special handwork there, may pursue the subject further, either in a third year of training or in some other way; (c) a college may provide a course of training specially devised to qualify students as teachers of handicraft, and to give them at the same time the general professional equipment qualifying them for recognition as certificated teachers. We believe the right policy is to ensure that the handicraft teacher is a teacher first. If that be so, then future progress should be on the lines of (b) and (c). In our opinion (b) is preferable to (c) so far as three years are better than two years for acquiring what is really a double qualification.

"We should perhaps say, the Committee add, that we cannot accept as practical some suggestions made to us for a course of education, to be obligatory in the case of all handicraft teachers, comprising a full secondary school course, a university degree or diploma course, and professional training, giving prominence to handwork throughout, in theory and practice, seeing that these proposals imply a reorganization of the existing educational system, in the interests of one subject. But we have said enough to make clear our own view that, as far as possible, the qualifications of any specialist teacher on the side of general education should be on a level with those of other teachers in the schools."

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

"PLAY BASEBALL WHILE LEARNING THE CASE"

G. E. Matthews, Cincinnati, Ohio

Many ways are used to teach the lay of a type-case; in fact, about as many different methods are used as there are instructors who teach the subject. No one way stands out as *the way* in which all difficulties are solved and every requirement is fulfilled. Among some of the methods used to teach the case may be mentioned the "Group Method" where the boxes are divided into groups and memorized. Another is the "Card System", where small cards, with a character printed on each, are used in practicing with an empty case. This with no other memory work would require a chart showing the location of the different boxes. Then there is the old-time way of "Setting out the Case" and many more. Among them may be found some that are more adapted to certain types of shops than others.

The scheme described here is not suggested as a substitute for any of the above methods but more as a means in which the student may begin to set imaginary type before he is put to work on a clean case of type. This game of "Baseball" simply tries out and furnishes drill in the method which was used to acquaint him with the case, and it does it in such a way that his mistakes do not pi cases. The success of the plan is due largely to the fact that it employs the very powerful instinct of *play*.

The necessary equipment for this game is, first of all, an empty California job case which should be fastened high on the wall in front of the class. Then a stack of small cards with one monosyllable word printed on each card. The words should be chosen so that there are numerous repetitions of all the letters of the alphabet, in order to cover the case thoroughly. A pointer about three feet long is used to point out the boxes as the word is being spelled from the case. A score-card is drawn on the blackboard in full view of the class.

Before beginning the game it is always well to have a little "practice." This will give the teacher a chance to pick out two members who seem to be more adept than the others. These are designated as score keeper and umpire, respectively. This removes from the competition two persons who probably would monopolize the "batting," and can be justified by the fact that they apparently do not need the drill as much as the others. After this selection is made any other two members may act as captains and the process of "choosing up" is in order. The teams then take different or separate seating positions to simplify keeping the score.

Next the rules of the game are explained to the class:

The first man "up to bat" takes a card from the stack, turns to the case and points out the boxes that represent the word on his card. If he succeeds in spelling the word correctly (the teacher is the judge of this, acting as umpire of bases) then his team is given one score; but if he mis-spells it, a negative score is charged to his side. He then takes a new card and tries again until he succeeds. The umpire then names the boy who was first to raise his hand indicating that he knows the word just spelled. If this player gives the correct word he is given a turn at bat, but no score is allowed for his being first. Should this player fail to recite the correct word spelled or is unable to give any word at all, his side is charged with a negative count while the batter takes a new card to spell. The fact that a negative count is the penalty for naming the wrong word eliminates practically all guessing. The only way a positive score can be made is by spelling a word correctly from the case, while negative scores may be made by error either at the case or from the desks.

The more baseball talk that can be injected into the plays the more enthusiasm is aroused, although enthusiasm is, by the way, never lacking. It may run so high as to give the teacher a problem in conduct. This can be controlled, however, by inflicting additional penalties in the form of negative scores.

At the end of the recitation, the score is tallied and the game ends. It takes about the equivalent of two or three sixty-minute periods to familiarize most beginners with the lay of the lower case. The same cards can be used for the capitals, either using them as all caps or as caps and lower case. To get the proper amount of drill on the capitals, one should use the cards as all caps. Then as a general review have them spelled as caps and lower case letters. To bring in the use of punctuation marks and spaces it would be necessary to employ the use of sentences in the same manner as was used with the word-cards. This, however, complicates things and does not prove as fascinating as the word drill.

It has always proved a good plan to follow up this drill with the first work in composition which may consist of lines of type made up of words in repetition which is practically the same as the "Baseball" with the addition of the use of the composing stick and the justification of lines of type.

JOB SHEET IN HOME MECHANICS—WOODWORK

F. E. Tustison, The Stout Institute

Job Specifications: To locate and bore the holes for a hand-caned panel.

Reason for Job: Sometimes it is necessary when re-caning a panel to bore the holes. In factory made chairs, cane webbing is often used and this is held in place with splines driven into a groove. If the webbing pulls out, the panel can be hand-caned. To hand-cane such a job, holes must be bored. New projects also demand the laying out and the boring of holes.

Material: Frame to be hand-caned, cardboard. If boy does not bring a furniture panel, different shaped frames can be assembled in the shop.

Tools: Rule, square, pencil, $\frac{5}{16}$" or $\frac{1}{4}$" bit, brace, countersink, and dividers.

Procedure: (1) Determine the size of the mesh. The average mesh is $\frac{1}{2}$" to $\frac{5}{8}$". This is the distance between centers of holes. A $\frac{5}{16}$" mesh is a good size for medium or fine cane. If a coarser mesh is desired, $\frac{3}{4}$" spaces can be used. Examine a pleasing panel and measure the mesh.

(2) Gauge the frame. Pencil gauge a line entirely around the inside of the frame. This line should be at least one-half inch from the inner edge. All holes should be on this line. For rectangular and quite irregular frames the holes can be stepped off immediately on this line. (See Fig. II.)

(3) Make a cardboard templet for an irregular panel. (See Fig IV.) Cut a pattern the same shape as the opening of the inside of the panel. Transfer this

FIG. I. BORING THE HOLES TO HAND CANE A CHAIR.

shape to a larger cardboard. Locate the gauge line as you did before.

(4) Draw a center line such as A, B. (Fig. III.) Center preferably the front and the back. On upright panels it may be top and bottom that are centered.

(5) Draw four working lines around the gauge line as per drawing. (Fig III.) These lines are all at right angles to each other. They are also parallel or at right angles to the center line A, B. Draw and check with a square.

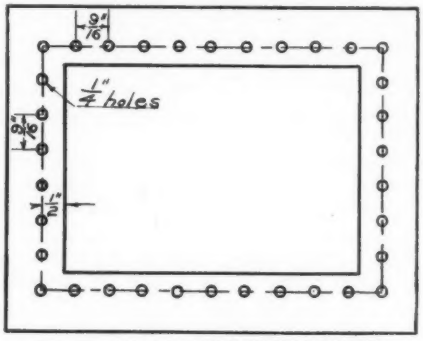


FIG. II. LAYOUT FOR REGULAR PANEL.

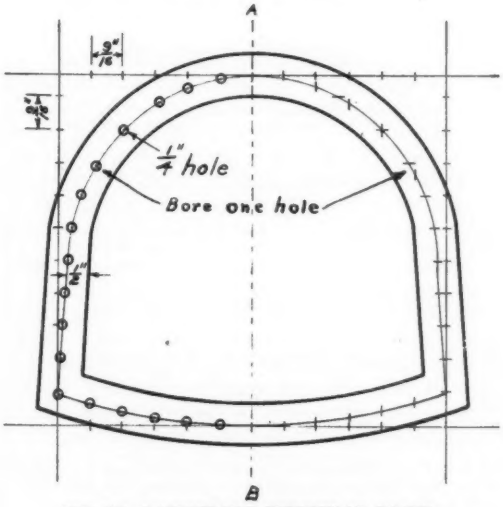


FIG. III. LAYOUT FOR IRREGULAR PANEL.

(6) Step off equal spaces on the working lines. (Fig. III.) If the mesh is to be $\frac{3}{16}$", set the dividers at this distance and make a trial division. Re-set the divider slightly until each line is divided equally into spaces as near to $\frac{3}{16}$" as possible.

(7) Locate the holes on the gage line. With a straight-edge connect opposite points on the working lines and mark where they cross the gage line. These crossings locate the holes. If two cross lines are quite close, (See Fig. III), one hole is located half way between the marks. It might be well to refer to steps 1 and 2 in the job sheet on hand-caning. (May INDUSTRIAL ARTS MAGAZINE, page 190.) Note that the strands in these two steps are all parallel and equi-distant, and at right angles to each other. It is obvious, then, that the holes must be so placed to accomplish this. For frames with straight sides at right angles to each other the holes can be located with the square. *Have your templet or frame checked at this point.*

(8) Transfer the layout to the panel. (See Fig. IV.) Trim the templet so it will lay on the panel. Punch through with an awl to locate the holes. Lift templet at intervals and check to see if the holes are being properly placed.

FIG. IV. LOCATING THE HOLES WITH A TEMPLET.

(9) Center punch and bore the holes. Center punch the marks locating the holes. This insures a straighter line of holes. Use $\frac{3}{16}$" bit for fine cane and $\frac{1}{4}$" for medium. Bore holes perpendicular into the wood. Countersink holes on the back. This will aid in caning. Sandpaper to remove the rough edges and working lines.

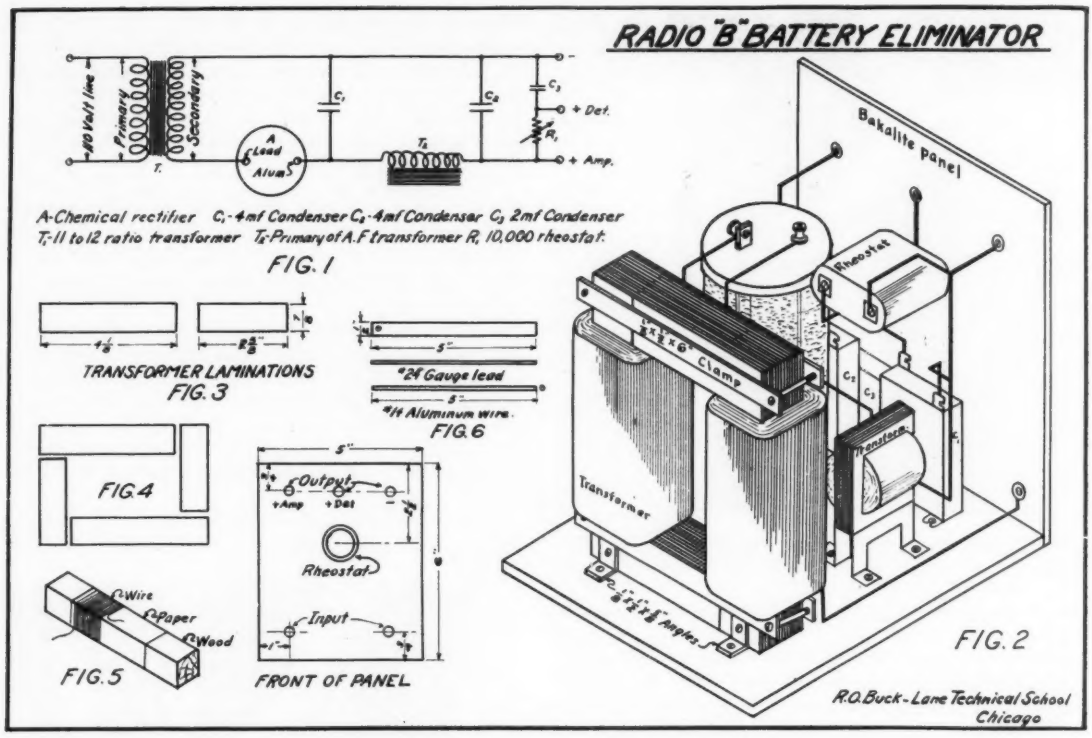
Questions: (1) How is webbing held into a panel? (2) Are the holes equi-distant on regular panels? Why? (3) Why is it easier to locate holes on a rectangular panel? (4) What is meant by the mesh of the weave? (5) How does the size of the cane used affect the distance between the holes?

Reference: Perry: "Seat Weaving."

RADIO "B" BATTERY ELIMINATOR

R. O. Buck, Lane Technical School, Chicago

Every radio fan has looked forward to the day when he could eliminate "B" batteries from his equipment, not only because of the expense, though that is no small item, but also because as soon as a single cell of a battery begins to break down the efficiency of the receiver is impaired immediately.



DETAILS OF RADIO "B" BATTERY ELIMINATOR.

After experimenting with several types of eliminators we have adopted the design given herewith as a stock problem in the electric shop at Lane. The students have been building this problem the past two months with splendid success. Many eliminators work well on most receivers but do not "choke out" the generator hum sufficiently, for use with the neutrodyne and one or two other very sensitive sets. Credit is due Mr. John Plaisier of the Lane faculty for the addition of the low ratio transformer across the A. C. line, making this eliminator practical for any receiver.

An eliminator of this type is intended to be used instead of "B" batteries on both the detector and amplifier tubes, with a 110 volt, 60 cycle, alternating current line as the source of current. The detector output can be varied from about fifteen volts to 45 volts by adjusting the rheostat. This is a great advantage as much of the "squealing" of receivers is caused by excess voltage on the plate of the detector tube. The voltage should be adjusted to the maximum without "squealing" for greatest volume. The output for the amplifier tubes is about 120 volts. A resistance may be put in series with this if less voltage is desired.

The eliminator, Fig. 1 and 2, consists of the following units: One 11 to 12 ratio transformer, one chemical rectifier, two 4-microfarad condensers, one 2-microfarad condenser, one ordinary audio frequency transformer, one rheostat having a range of 5,000 to 15,000 ohms resistance. Also five binding posts, one five by six panel of bakalite or formica and a wood mounting board.

The 11 to 12 ratio transformer may be built as follows: Cut as many strips of soft sheet iron, such as stove pipe iron, 4⅛" long and ⅞" wide as are required to make a pile ⅞" high when loosely piled. Count these and make one more pile of the same size and two piles of end pieces 2⅝" long and ⅞" wide, ⅞" high again. See Fig. 3.

Next make four clamp bars ⅛"x½"x6" and drill for 8-32 machine screws 1¼" long as shown by Fig. 2.

To wind the coils, square up a wood form 15/16"x15/16"x5" and cover it with one or two layers of heavy paper or fibre. For the primary coil wind 1100 turns of No. 24 double cotton covered wire on this form as evenly as possible and covering only four inches of the form. Make as many layers as necessary, covering each layer with waxed or transformer paper. The outside should be covered with tape or "Empire" cloth. Slip the coil off when completed and wind the secondary in the same manner on the form, putting 1200 turns of the No. 24 wire on in this case. Slip the coils on the two 4⅛" stacks of core laminations after which the end pieces can be slipped into place one at a time in the arrangement shown by Fig. 4. Note that each joint is bonded just as in the corner of a brick wall. The break in the joint is first at one corner then at the other. It will probably be necessary to drive the last six or eight in with a block and hammer.

The transformer should now be clamped together with the clamp bars mentioned, after which the entire transformer should be thoroughly dried out in an oven, then dipped in hot paraffin or pitch so that all moisture will be excluded. The holes for the angles that hold the transformer to the base should now be drilled and tapped. The angles may be made of almost any material about the size shown on Fig. 2. This completes the transformer.

The rectifier is made out of a glass jar about five inches high and two inches in diameter, having a tight rubber stopper. The ten-cent stores sell jars of this type fitted with a rubber top but any jam or olive bottle and rubber cork about this size will do. The plates consist of a strip of lead 5"x½" of about No. 24 gauge, and a piece of No. 14 aluminum wire or 1/16" square strip of aluminum plate five inches long. A binding post may be fitted on each as shown or clips may be used. The liquid is a saturated solution of ordinary commercial borax in distilled water.

The three condensers are of the commercial, fixed type such as used in telephone work and are of the capacities stated. If you have difficulty in securing the required values you may use several of smaller value to make up the required capacity. As the condensers are the "heart" of the filter they must be of good quality and accurately rated.

The primary winding of any inexpensive audio frequency radio transformer may be used for the filter coil. The secondary winding of this transformer is not used.

There are two or three rheostats on the market that cover the range required for this project. They may be obtained at any of the larger radio supply stores at a nominal cost. If the carbon type is used I would suggest mounting it vertically, as this type while efficient is noisy when mounted otherwise.

A panel layout is shown on the drawing; of course this is optional, you may find it convenient to change the size and general arrangement to fit your cabinet. We use No. 14 square bus bar to connect the various parts of the eliminator though ordinary No. 14 rubber-covered wire would do just as well but does not make such a pleasing appearance.

On many actual tests and with nearly every type of receiver we have found that the generator hum was either completely filtered out, or could only be heard faintly with the phones so was not detrimental to good reception. This is all that the commercial types claim for their eliminators.

In some cities a metal box is required to house all transformers. If this is the case in your city or state you will have a nice little problem for your sheet metal classes.

CAMP GRATE

Ross Miners, Wakefield, Mich.

We have all observed, more or less, the special interest that boys take in projects that they themselves can use.

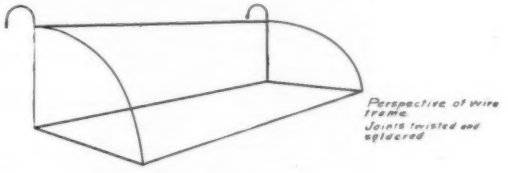
The accompanying drawing is a camp grate designed to give the boys in elementary machine shop practice this chance, and at the same time to learn the use of the following tools: Rule, hack-saw, hammer, center punch, drills, files, taps and dies.

This is not a hard project for the average boy to make. The operations, such as measuring, sawing, laying-out, drilling, riveting, tapping and threading, are fundamental operations that every boy should be able to perform.

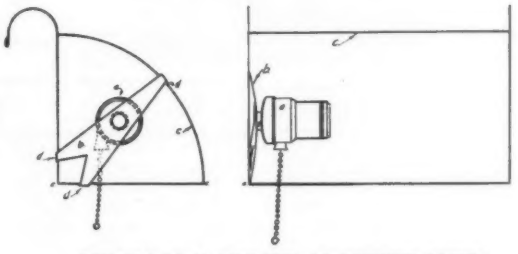
THE BEDSTEAD BRACKET LAMP

Carl A. MacMiller, San Antonio, Texas

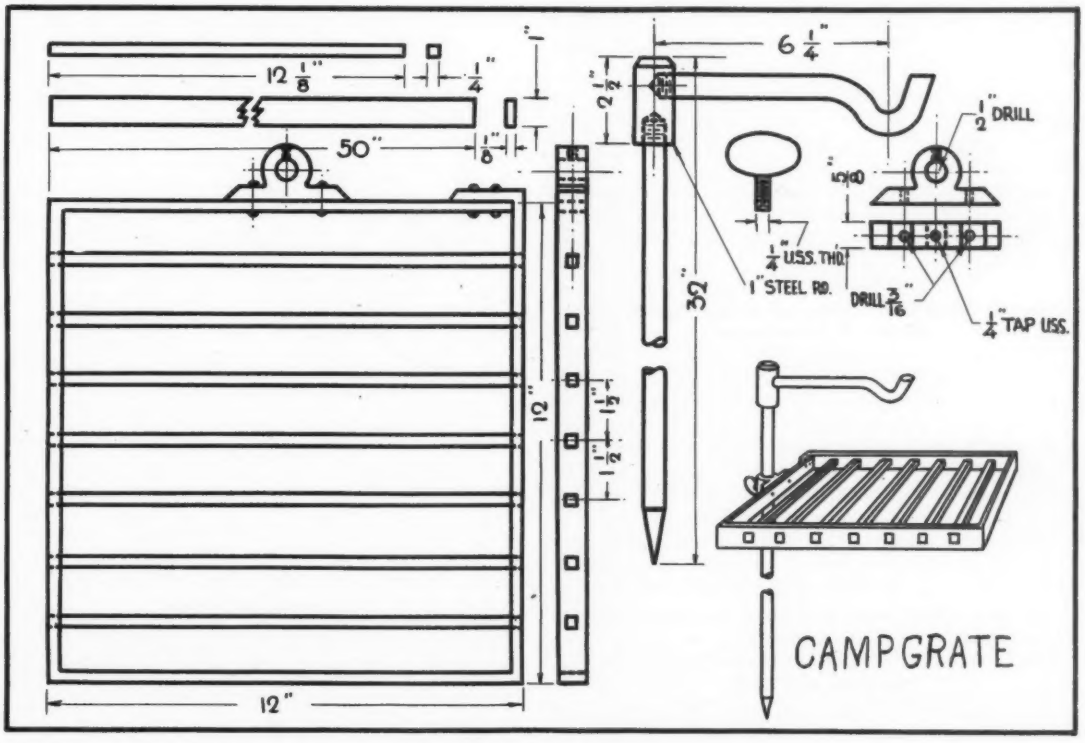
The bedstead bracket lamp shown herewith is one that can be made easily in any sheet metal shop and will arouse some amount of interest because it is one of the



HANDY BED OR DRESSER LIGHT



DETAILS OF HANDY BED OR DRESSER LIGHT.



DETAILS OF CAMP GRATE.

type of projects that no pupil (especially in the fifth or sixth grade) will have to work on for a month or more before he will be able to see the results of his labor. Some of the lines of work included in the making of such a lamp are the following:

1. Sheet Metal—Bending of frame to accurate shape and size; selection of kind of wire for specific purpose; coating of different wires and their adaptability to different purposes because of it; effect of coating on job of soldering and solder and on other things it comes into contact with; forming of brass bracket to hold receptacle, etc.

2. Electrical—Study of lighting and the incandescent light. Colors of lights that are "easy" on the eyes. Shapes of bulbs and their purposes and suitability to common purposes. Construction of sockets and their possible weaknesses and repair. Construction of plugs. Wiring of a flexible cord. Types and kinds of insulators and insulation. Kinds of covering used on exposed wires in a room. Underwriters' rules regarding the length and size of such cords.

3. Sewing or Millinery Class—Covering the shade with some sort of semi-transparent material. Hidden seams and hems. Border trim and hiding of "unfinished" edges. Lace. Blending of colors.

4. Interior Decorating Class—Selecting the proper color and shade of silk or other material for the shade. Hang the lamp so that it will look well as well as serve its purpose as a lamp.

In Case of a Buff Paper Shade—Design of the decoration of the shade. Study of colors and blending of same. Colors restful to the eyes. Coloring interior of shade. Proper "scheme."

DEPTH GAUGE

Albert J. Pfau, F. V. Thompson Junior High School, Boston, Massachusetts

A useful and handy little tool for the home tool chest, is shown in the accompanying drawings. It is made entirely of cold rolled steel and costs but a few cents.

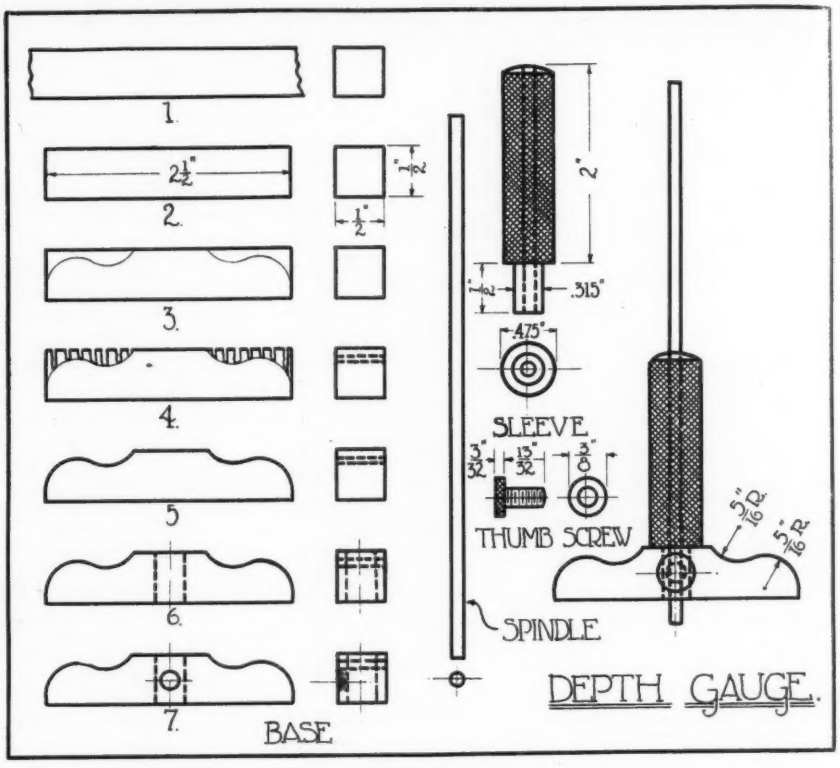
A feature of this little article is that the making of it requires the use of power machines, as well as of many small hand tools. It is a very suitable project for boys of junior high school age. When finished and polished nicely, it is a tool that the boy is proud of.

The pupil should be given this job after he has become acquainted with and used all of the tools on previous projects. When given a drawing similar to that shown here, it is surprising to see how far along he can get with the job, before he requires assistance.

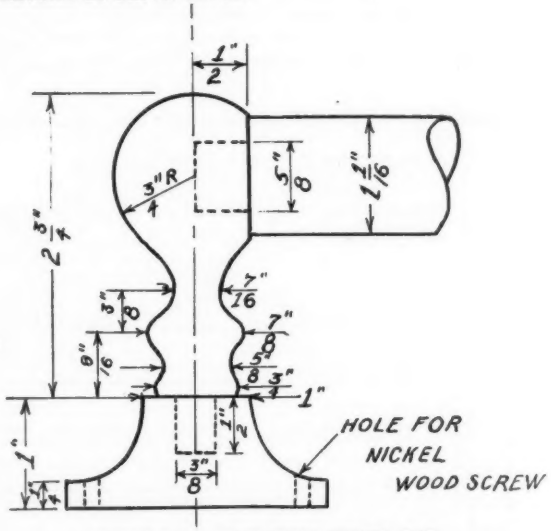
Base. Make 1. Cold rolled steel ½"x½".

Procedure and Tools

1. Cut off stock 2⅝" long, ½" square. Use hack saw and scale.
2. Square up, to finish size 2½" long. Use file, square, outside caliper.
3. Trace around model. Center punch around outline. Use scriber, center punch, and hammer.



DETAILS OF DEPTH GAUGE.



DETAILS OF BATH ROOM TOWEL BAR.
Designed by L. L. Orr, Principal of the Junior High School, Bennington, Vt.

4. Cut or gash with hack saw to within 1/32" of line. Chip with flat chisel. File to line. Use hammer, chisel, half-round file.
5. Finish file to line. Use smooth half-round file.
6. Lay out for hole in center. Use small drill first. Be careful that hole comes central. Follow with 11/64" drill. Ream hole to 3/16".
7. Drill and tap in center as shown in Step 7, for 6-32 thumb screw. Use No. 35 drill, and 6-32 tap. Small tap wrench.

PERSONAL NEWS

Miss Kate S. North has been elected to succeed Mrs. Maud Richmond Calvert, as state supervisor of home economics education in Oklahoma. Miss North has a degree in home economics given by the Oklahoma Agricultural and Mechanical College, and has completed graduate work at the Chicago and Columbia universities. She was formerly connected with the state department of education of North Dakota, and also directed similar work at the Teachers' College, San Jose, Calif.

Miss Margaret V. Shaw, supervisor of home economics in the Thomas high school, Oklahoma City, Okla., was married in April to J. S. Hollman of the University of California. Miss Bonnie Huston succeeds Miss Shaw at Oklahoma City.

VOCATIONAL EDUCATION SOCIETY OF BOSTON—BUSINESS MEETING

Frederick Ames Coates, Milton, Mass.

"Where can the line be drawn between general education and trade preparatory training?" asked Mr. Walter E. Russell, director of Franklin Union, speaking before the members of the Vocational Education Society of Boston, at their annual business meeting held in the Napoli Restaurant, Saturday, May 9.

It is a shady line at best, argued Mr. Russell; and in the largest sense must be based rather upon the age of the pupils than upon the content of the courses. He questioned the propriety of urging, or expecting, young people to select their life work at 16 or younger; both because their desires and aptitudes are as yet unformed, and because at present a rapid shifting of industry is taking place, accompanied by the rise of new occupations and the alteration of old ones. Mr. Russell challenged the audience with the question, how many of those present had made—and followed—the early choice of occupation now advocated in many quarters?

It is a normal development, he contended, and not a sign of imperfect functioning, that so many graduates of trade schools and industrial courses fail to enter the occupations for which they were trained in school. The speaker conceded the crying need of industry for trained workers; and also pointed out its reluctance to employ youth below the age of 17. Above that age, the youth's realized earning power and perhaps his need are likely to preclude formal full-time trade training. Moreover, industrial education—like training in anything else, from foreign languages to swimming—can be more effectively given at an earlier age. The answer is—give it. Both industry and the individual will directly profit in the case of the pupil who does follow the occupation trained for. In the case of the boy who does not, asserted Mr. Russell, the training is far from wasted. It can function in any walk of life, exactly as well as can the more "respectable" classical forms of education. The speaker referred to the last report of Dr. Pritchett of the Carnegie Foundation, in which he included in his suggestions for a uniform college entrance requirement, mechanical drawing; and to the more general statement in the same report of the two-fold purpose of education: liberal training for power of mind and heart, and technical skill for the arts and crafts. Mr. Russell emphasized the importance of giving every child an early conception of industry—far less possible to obtain in an informal way now than formerly. The school can do this. Much also can be done outside school walls. It is an inestimable benefit to a young person, he claimed, to be allowed and encouraged to go to work when he feels the urge to do so, whether or not he intends to continue his formal education later. Contact with the actuality of labor will convince him of the value of further training as nothing else could do. What a boy works at is less important than the fact that a boy works, even if only on summer jobs. The mere industrial contact is worth more than a deliberate specialization. There is no such thing as a "blind-alley job," declared Mr. Russell—though there are many "blind-alley boys."

The speaker sketched briefly the rise of industrial education, from the time of Queen Elizabeth, when criminals and paupers were "bound out" to learn trades. In this country, he stated, the system of apprenticeship strove to meet the demand which arose when America first threw off its dependence upon the Old World for manufactured goods. A second stage in our industrial history was heralded by the arrival of steam power, and the mechanical arts which it entailed. The federal grants for "agricultural and mechanical colleges," and the foundation of many public and private technical institutes, marked this period on the educational side. The third epoch is the one in which we are now living: the epoch of high specialization, of automatic machinery, of rapid change and development. The wide-spreading interest in vocational education is the public response to the present need.

A pitfall to be guarded against, warned Mr. Russell, is the tendency to raise vocational schools to too high a plane, or to allow them to veer towards formalism and classicism. This fate has engulfed all the older technical institutes. They have become institutions of college grade, training engineers but not artisans. One of the best-known maintained in earlier years one-year and two-year courses, with purposes similar to those of present-day vocational schools. Now its entrance examination is more difficult than those of most liberal arts colleges, and the four-year degree course is the only one given. This tendency already threatens our modern trade schools. The speaker cited one which made such careful selection of its students that none of them, upon graduation, chose to work at the bench in the trade trained for.

There are myriad occupations, contended Mr. Russell, demanding trained skill in their workers. In supplying it, the vocational school has a wide field of usefulness. But it is a mistake to assume that a four-year course, whether of high school or of college grade, is called for. For

ROBERT E. BAKER,
President Boston Society for Vocational Education,
Boston, Mass.

many occupations, such a preparation is entirely too long. As brief a course as a single year might meet the demands of a given trade. In war-time, men were trained in considerably shorter periods than that to a satisfactory level of skill; but we can hardly expect to duplicate those emergency conditions now. Certain private institutions take advantage of the reaction against long courses by advertising to "make a draftsman in ten weeks' spare-time study;" or to produce electrical engineers and the like in a year or less. Such institutions are of course culpably misrepresenting their courses, and their pretentions are discounted.

Yet there is a greater danger, said Mr. Russell, that bona-fide vocational schools will make their courses too long than that they will unduly abbreviate them. The four-year course fetich is likely to be served through padding the content with technical and classical material. If a school purposes to give strictly vocational training, the speaker inclined to the opinion that two years is for most trades likely to be nearer to the ideal period of instruction than four; though each trade should be made the object of unprejudiced study and allowed to dictate its own training-time requirement.

Before the introduction of Mr. Russell as the speaker, Mr. Philip C. Molter of the Department of Education of the National Metal Trades' Association talked briefly upon the work of his organization. The thirteen hundred members of the Association, he said, have been handicapped by the dearth of skilled men, from whom they can draw foremen and executives. For the past six years a serious effort has been under way to put into effect an educational program. Up to the present time, its chief successes have been in Milwaukee, Chicago, and other cities outside of New England.

This was the Society's last meeting of the present school year; and its chief business was the election of officers. The nominating committee reported, and its selection was unanimously endorsed. The new officers are:

Robert Baker of Boston, president; Ralph W. Babb of Lynn, vice-president; Emerson Staebner of Newton, secretary; Frederick Chandler of Salem, librarian; Leroy M. Twichell of Malden, treasurer.

A communication from the Massachusetts Teachers' Federation, inviting the Society to join it, was referred to the executive committee to be reported upon at the next meeting in the fall.

Eastern Arts Convention at Springfield, April 23 — 25

Arthur F. Hopper

The Eastern Arts Association held its sixteenth annual convention in Springfield on April 23, 24, 25. It was one of the best attended conventions in the history of the Association—over one thousand members were present.

Prior to the general Thursday evening session there was a dinner and conference of the association council. Council members and officers who attended were: President, A. H. Wentworth of New Haven; vice-president, George F. Hatch of Boston; chairman of the editorial board, Arthur F. Hopper of Plainfield, N. J.; secretary-treasurer, Frank E. Mathewson of Jersey City, N. J.; executive chairman, C. Edward Newell of Boston, Burton Adams of Springfield, William R. Ward of Trenton, Miss Frances Bachelor of Hartford, W. L. Cummings of Boston, Harry L. Jacobs of Buffalo, Arthur D. Dean of New York City, Edward Emerson of Boston, Thomas Dillaway of Philadelphia, Frederick Putnam of Providence, Frederick P. Reagle of Montclair, N. J., Royal Bailey Farnum of Boston; George A. Burridge of Springfield.

Heretofore it has been the practice to devote Wednesday evening to a round table discussion. This meeting has usually been attended by fifty or sixty of the early arrivals. The convention, however, has now become so popular that those attending make it a point to be present at the very beginning. This has resulted in turning the round table into a general session. When President Wentworth opened up this session shortly after 8 o'clock, the ball-room of the Hotel Kimball, which was headquarters for the convention, was packed. Franklin A. Latimer, vice-chairman of the school board, Springfield, gave the address of welcome. Mr. Latimer traced the history of the city of Springfield, stressing the growth of the school system which he claimed to be second to none in the country. He spoke of the forty school buildings, housing 25,000 pupils, requiring a thousand teachers, and representing about ten million dollars capital expenditure. He said that for this expenditure the citizens have received one hundred cents for every dollar.

Mr. Latimer was followed by Mr. Melville C. Freeman, head master of the High School of Practical Arts, Boston, who gave an address on the life of Alexander Hamilton. It was an historical and inspirational talk devoted entirely to this great man's life. Robert N. Cram, landscape architect of Harvard University, gave an illustrated lecture on "English Gardens." Some exceptionally fine slides were shown.

The first main session of the convention was held in the Mahogany Room of the Municipal Building and was called to order by President Wentworth at 10 o'clock at which time there was standing room only. Addresses of welcome were made by Mayor F. C. Parker, Dr. Zenos E. Scott, superintendent of schools, and Miss Agnes Craig, chairman of the hospitality committee, following which the assembly was addressed by Dr. Payson Smith, commissioner of education for Massachusetts. This proved to be one of the best addresses of the convention and was listened to with keen interest by all present.

Dr. Smith urged those present to show a more active appreciation of the fundamental importances of their subjects in the whole scheme of liberal education as the first requirement in making their departments important parts of the school curricula. Miss Loretta Curran, first assistant of manual arts, Boston, also gave an address in which she made a plea for closer cooperation between the various departments in schools, showing by numerous illustrations how the arts, the mathematics, the history, and other departments may become essential parts of such apparently unrelated courses as sheet metal work, or printing.

A noon luncheon of the convention, held at the Hotel Kimball, was addressed by Mrs. Mary Schenck Woolman, expert in vocational education, Boston. During the course of her remarks, she spoke of the number of people who prefer European goods to well made American goods, thus injuring American production. She showed some American textiles that were in excellent taste. The audience was very attentive and much interested in this talk.

The afternoon was occupied by the discussion of specialized subjects in sectional groups. The groups represented were Fine Arts, Manual Arts, Part-Time Education, Vocational Training, Training for Sub-Normals, Home Economics, and Training in Agriculture. All these sectional groups were largely attended. A banquet was held Thursday evening at the Hotel Kimball. It proved to be the largest banquet ever held in this hotel. Ante-rooms had to be used to accommodate the overflow and it also became necessary for a considerable number to find places in the general dining-room. The toastmaster for the evening was Mr. Frederick J. Hillman, vice-president, Springfield Chamber of Commerce. Music was provided by the Springfield high school's orchestra under the direction of Mr. John F. Ahern, supervisor of music. A number of selections were played which were thoroughly enjoyed by everyone. The Reverend Neil McPherson gave a very inspiring address and in the course of his remarks stated that sane imagination has as much to do with progress as disciplined reason. Dr. McPherson used the life of Savonarola as an illustration of the quality of imagination which this age needs. He regretted the fact that the present day is touched with flippancy and that "We don't believe the things we affirm." He stated artistic creation awakens the sense of idealism and a sense of truth which we need. A man never truly believes a thing until he is ready to die for it as Savonarola died for his beliefs. He urged upon the large gathering of art teachers their responsibility to develop the love of truth in the younger generation. In the absence of Dr. James A. Nugent, superintendent of schools, Jersey City, Frank E. Mathewson, secretary and treasurer of the organization and director of the William L. Dickinson high school, introduced a

SIXTEENTH ANNUAL CONVENTION OF THE EASTERN ARTS ASSOCIATION, APRIL 22, 23, 24, AND 25, HELD AT MEMPHIS, TENN.

GEO. F. HATCH,
President-Elect, Eastern Arts Association, Boston, Mass.

FRANK E. MATHEWSON,
Secretary-Treasurer Eastern Arts Assoc., Jersey City, N. J.

A. H. WENTWORTH,
Retiring President of the Eastern Arts Association, New Haven, Conn.

motion picture illustrating the progress of the schools in Jersey City.

Friday morning was given over to visiting schools of the city of Springfield. Every courtesy was shown the delegation who took this opportunity to examine at first-hand the work of this up-to-date school system. The afternoon was devoted to sectional conferences all of which were again largely attended. On Friday evening a very enjoyable social affair in the form of a dance was given by the Commercial men. This gave everyone an excellent opportunity to become acquainted and the evening was thoroughly enjoyed by all present.

Dr. Robert E. Cooley, director of Milwaukee continuation schools, spoke at one of the sectional meetings and also at the general session Saturday morning.

C. Edward Newell, director of manual arts, Boston, formerly of Springfield, spoke on "Flowers—Their Influence in the Arts." His lecture was illustrated by an artistic grouping of the stage to set off an ideal arrangement of flowers, rugs, vases, draperies, paintings, etc. Mr. Newell described numerous illustrations of flower designs and showed the great variety of ways in which flowers have been used for ornamental effect on pottery, drapery, furniture, platters and plates, etc.

The exhibits were arranged in the auditorium of the municipal building. The entire ground floor was taken up by an exhibit of the work of the Springfield schools, while the first floor was devoted to school exhibits from various parts of the country including a members' exhibit and the commercial exhibits. The exhibits on both floors were unusually well arranged and attracted much attention and favorable comment. The commercial exhibit showed up to good advantage, as did the members' exhibit, which was of unusual interest and without doubt one of the best ever submitted.

The Convention was brought to a close at the business meeting on Saturday. Its success was made possible by the inspiration of the President, Mr. A. H. Wentworth, by the hard work of the vice-president, George F. Hatch, who was responsible for the entire program, and by the untiring energies of our cordial and hard-working secretary, Frank E. Mathewson, to whom much credit must be given for the development and remarkable growth of the Eastern Arts Association during the past few years. Credit is also due the Springfield executive committee composed of Dr. Zenas E. Scott, superintendent of schools, advisory chairman; C. Edward Newell, supervisor of arts and hand work, executive chairman; Burton A. Adams, supervisor of manual training and practical arts; and George A. Burridge, director of vocational school. This was an unusually strong executive committee all of whom gave unsparingly of their time in order to make this Convention one of the best ever held. There was ample evidence of their success.

At the business meeting the following officers were elected for the coming year: President, George F. Hatch, Boston; vice-president, Arthur F. Hopper, Plainfield, N. J.; Secretary, Frank E. Mathewson, Jersey City, N. J.; Board of Council for three years: William Kidd, Syracuse, N. Y.; Miss Zara B Kinney. Albany, N. Y.; Erik A. Anderson, Providence, R. I.

The next convention of the Association will be held in Syracuse, N. Y., in the spring of 1926, at a date to be announced later.

A TECHNICAL INSTITUTE FOR NEW YORK

The need of a state technical institute is urged by Lewis A. Wilson, director of vocational education for New York State, in a pamphlet issued by the University of New York.

Mr. Wilson points out the industrial importance of the state and then discusses the services the proposed institute could render. He says that studies in tranportation facilities are in order. The possibilities of producing electorial power must be revealed. The commercial possibilities of the state's mineral resources are as yet unknown. Likewise, marketing facilities warrant careful study.

He also points out the need for research work in aid of the production agencies, for factory construction, trade and technical training, accounting and business methods, etc., etc.

Under trade and technical training he suggests textile, clothing and shoe manufacturing, power machine operating, automobile repairing, machine shop work, food preparation, printing, furniture making, and designing.

MANUAL TRAINING FOR GIRLS

Richard Fawley, Instructor, Manual Training

On Thursday of each week the Palestine Township High School, Palestine, Illinois, has one period set aside for extra-curricular activities. Among these extra-curricular activities there is a manual training class for girls. During the entire school year, the fifth period of each day is set aside for study, except for classes in home economics, manual training, and commercial work. This fifth period on Thursday is devoted to extra-curricular activities.

Seven girls are enrolled in the manual training class. The first few lessons were spent explaining the common tools, their uses, and the elementary processes in woodworking. Part of the course was devoted to work in wood while the other part was devoted to weaving. Among the articles made were a fire-screen, a magazine rack, stationery holders, and several articles of fibre cord, including candlesticks, a bridge lamp, serving trays, and a boudoir lamp.

At the present age the "Jack-of-all-Trades" is past. A man knows very little about the kitchen. A woman knows little or nothing about the shop or trades. We have, in our extra-curricular activities, attempted to give the boy a look at the kitchen and the girl a sample of the shop.

IMPRESSIONS OF THE WESTERN ARTS CONVENTION

E. J. Lake

The thirty-first annual meeting of The Western Arts Association at Memphis was so full of good impressions for the teacher of art and so emphatic of progress in art education in the public schools of the Central and Southern states that we must pass the good word along.

A surprise was in store for the teacher of the north who recognized the superiority of culinary arts in the south but imagined that the graphical arts had difficulty in fording the Ohio.

The conspicuous feature of the exhibits and of the program was design. Logical, thoughtful arrangement of form and color to express purpose and beauty was the keynote of the convention. So long as our teachers are guided by the one important purpose of enriching the lives of children through the practice of tasteful composition, our art education is safe, sane, and indispensable.

Henry Turner Bailey was the disciple who impressed this guiding purpose. No one could do it better. Few could do it as well. Mr. Bailey was here, there, and almost everywhere on the program and at the various meetings, giving inspiration and advice with characteristic energy and effectiveness.

One outstanding feature of the program was the display and explanation of textile weaving and printing. We learned that cotton, just ordinary cotton, grown and manufactured in the Southland; aided by art and science, has become as durable and admirable as the silks of the Orient. By careful and artful design a material that a few years ago was limited to a few common purposes, has become available for the richest effects in dress and decoration and is finding a market the world over. Surely the industrial-arts teacher of the future will have a wide range of interests and many beautiful examples of the applied arts to illustrate them without going to foreign lands.

What a splendid feature of each annual program would be the exhibition and demonstration of American art industries?

The exhibition of school work at Memphis was comparatively free from cut-and-horribly-dried published class exercises. Oh, to be sure, one could find here and there discounted copies and made-over models in the exhibits, but the curse of innocent or stupid plagiarism is going out. We are learning that little is gained morally, mentally, or esthetically by having children fill in outlines that are supplied, and pass them off as original works of art.

Cut paper and block printing as a means of studying and executing composition are evidently on the increase. These are fine school mediums and when they are used in the expression of school and industrial interests they seem to offer especial opportunities for originality with the least technical difficulty.

The "posters and pattern in paper" period has not yet passed. We rather hope it will persist; at least until our school work can be made genuinely applied and that seems hardly feasible under the present system.

Here and there in the Memphis exhibit one could see the evidences of a superior craftsman teacher who carried the child through a project from the first conception of purpose in design to the finished product with remarkable educational possibilities. Here and there were the interesting results developed by a class or even a community working together. A complete town in miniature and to scale held a prominent place in the exhibit. One wonders how time could be found for such a project without giving all but the industrial-art teachers a vacation, yet we are assured that many happy, busy hours were put in on the design and making of that town. We are convinced that each boy and girl who took part in the design and making of those interesting miniature homes, schools, shops, parks, and complete civic outfit will have a keener interest in the design and making of the community in which they live and grow up. Perhaps they have acquired that inquisitive thirst which the lazy-minded fellow did not have, who confessed that he had worn out three automobiles but did not know what made the —— things go.

We sometimes have a conscience smitten feeling that our school art projects give too little technical training. We sometimes feel that the old idea and ideal of making good draftsmen, careful painstaking workmen, skilful and thorough craftsmen must not be lost in the attempt to develop esthetic sensibility.

As the exhibit at Memphis is seen in retrospect we recall a few examples of careful craftsmanship; some excellent needlework; some rather tight but careful drawing; some intricate landscapes that must have taken hours to render with a too hard pencil; some water color studies of flowers and still-life that were rendered with small brushes on dry paper and looked as though they had suffered with the crops for want of April showers. This has been a dry spring.

MISS HARRIET CANTRALL,
President Western Arts Association, 1925-26,
Springfield, Ill.

Next year we go to Des Moines, Iowa. With Harriet M. Cantrall, of Springfield, Illinois, for president, and H. Estelle Hayden as hostess, we may expect a great and glorious convention.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION AT THE MEMPHIS MEETING

R. F. Kuns, Cincinnati.

While the attendance at the industrial arts section and the vocational education section of the Western Arts Association was not all that had been hoped for by the committee in charge of program making, those present did feel well repaid for their attendance. Instead of opening the convention with a general meeting, the sectional meetings were called on Tuesday afternoon, May 5. Visitors seemed to miss this inspirational feature of seeing the entire convention gathered into one group at the very beginning and of having the opportunity of greeting friends from all departments represented. The combined meeting of the industrial arts section and the vocational education section which was held on Wednesday afternoon was better attended. This meeting, however, had to be closed early on account of a sight-seeing trip which had been arranged for all visiting members of the association.

Members of the association from the North were pleased to find that many worth while pieces of vocational and industrial arts education are being carried on in Memphis. Contacts made with members from other cities in the South indicated that the general plan of shop work as carried out in the northern cities is well seconded in many of the cities in the South. A good program of industrial arts education is being carried out in the Memphis schools. A rather exceptional piece of vocational education is being conducted in the Crockett Technical High School, under the able leadership of Mr. Highsaw, the principal.

Cotton grading and lumber grading are taught in this school in a way which ties the school and these industries together in a worth while way. Memphis is in the heart of the hard wood markets of this country. It has long been famed for its cotton markets. Aside from these two very close contacts with the leading industries, the Crockett school is offering work in machine shop, wood work, printing, sign writing, music, stenography and typewriting, automobile repair, cooking, sewing, and similar work for the girls. A fine spirit is in evidence everywhere in spite of the fact that many classes are overcrowded and many are housed in temporary buildings.

Mr. Forest T. Selby, formerly of Miami University, presented a paper giving an outline for real service in vocational guidance. He touched particularly on the need

of a fraternal relation between the pupil and the teacher. This work in a small community need not be confined to the schoolroom and desk.

Professor Phillips of the University of Missouri, presented a good paper on the analysis of a job and operation sheet, pointing out some of the dangers in their use as well as commending the good points in the use of each. There is need of standardization of the use of the terms job sheet and operation sheet in order that educators may have the correct impression when these terms are used.

Mr. Elmer A. Christy of Cincinnati urged the development of more worth while courses in our senior high schools. He stressed the point that our grade schools and our junior high schools are doing as advanced work as our senior high schools have been in the habit of doing in years gone by. Work which senior high schools have held sacred to their shops is now done in the junior high school with facility, and in many instances it is even done in grade schools. There seems to be a very real opening for the senior high schools in many places to offer work, which might be in the nature of junior engineering courses. If work formerly done in the senior high schools can be done in the junior high schools it is quite likely that it would be wise to take some of the work from the university and offer it to the senior high school boys.

At the meeting of the vocational section on Tuesday the election of a chairman for the sectional meeting was referred to the Council of the Western Arts Association. It was felt that the place of the meeting ought to be determined before the selection of the chairman was considered. Prof. Whitcomb of Miami University, presided at the vocational meeting on Tuesday, and again at the joint meeting of the industrial arts and vocational sections on Wednesday.

Industrial Arts Vocabulary

F. S. Crispin, Philadelphia, Pa.

(Continued from June)

Babbitt's Metal—An alloy of tin, copper, and antimony used for lining the bearing parts of engines and machines, which are subject to much friction.

Back Gear—An arrangement of toothed wheels by which the power of a driving belt is proportionally increased, as on the head of a lathe.

Backing of a Rafter (Arch.)—The bevel on the top edge of a hip rafter.

Backing Out—The running back of a tap or die after a thread has been cut.

Back Saw—Any saw whose plate or blade is stiffened with a metallic back. Tenon and dovetail saws are back saws.

BACK SAW

Balance Weight—The weight placed on the inner edge of a wheel to effect perfect balance. A weight slid over the end of a lever and attached thereto to counterbalance a moving part.

Balcony (Arch.)—A platform or gallery projecting from the wall of a building, enclosed by a balustrade or parapet.

Ballast—Gravel or broken stone used on a railroad bed.

BALUSTRADE

Balustrade (Arch.)—A series of small columns or balusters surmounted by a top-rail or coping.

Band (Arch.)—A line or course of stone in a wall projecting beyond the face of the wall.

Band Saw—An endless saw running on revolving pulleys, used for cutting curved work in wood.

Barge Board (Arch.)—The board which lies flat against an exterior side wall at the junction of the side wall and eaves.

Bascule Bridge—One in which the leaves (or leaf) are pivoted on a horizontal shaft and lift vertically.

BASCULE BRIDGE

Base Board (Arch.)—A board used for finishing and protecting the base of the walls of a room.

Base Plate or Bed Plate—The foundation plate or support of a piece of machinery.

Base Circle—or fundamental circle—In gear drawing, the circle on which the involute gear tooth is constructed.

Base Course (Arch.)—Related to masonry; the first course or foundation course upon which the remainder rests.

Base Trim (Arch.)—A board or molding used for finishing off the base of a piece of work; as a base board.

Basic Steel—Steel produced by the basic process; i. e., the means by which the phosphorus and sulphur are eliminated from pig iron in the Bessemer process.

Basswood—The name given American linden or white wood; the wood resembles pine in appearance but is more flexible. It has a greater tendency to warp. It is much used for curved panels.

Batten—A narrow strip of wood attached for protection of edges or to prevent warping; cleats are also termed battens.

Batter—The backward and upward slope of a retaining wall.

Bay (Arch.)—The space between two piers or columns.

Bead (Arch.)—A thin molding, generally half round or round in section.

Bead Plane—A plane used for making a circular molding on the edge of a piece of wood.

Beam (Arch.)—A piece of timber or other material or a built up structure whose length is greater than its width or depth, and whose strains are those due to leverage, tension or compression.

Bearing—The support or carrier of a rotating shaft, or axle.

Bearing Metals—Anti-friction and white metals, brass, and gun-metals, and the various alloys used for making or lining the bearings of journals.

Bed Mold (Arch.)—Molding used as a finish underneath an overhang; e. g., the finish molding at the joining of the eaves and outside wall.

Beech—A light brown wood, hard and close grained.

Belfry (Arch.)—That part of a steeple or tower in which a bell is hung.

BELFRY

Bell Metal—A hard, brittle, sonorous alloy of copper and tin used for casting bells.

Belt—A band or strip of leather, canvass or other material, flexible enough to act as a transmitter of power over smooth pulleys; acting by friction only.

Belt Conveyer—A wide belt running over pulleys, transporting materials laid and carried on it.

Bench Hook—A stop for sawing light work on the bench without damaging the bench itself.

JACK PLANE

Bench Planes — Frequently used planes kept on the bench—Jack, trying, and smoothing planes.

Bench Work—Work carried on with hand tools at the bench or vise. The term is used to distinguish this kind of work from machine work.

Bent Gouge—A gouge curved in the direction of its length; used by pattern makers for hollowing out the concave portions of core-boxes, etc.

Bevel—An adjustable tool used for testing the accuracy of work which is cut to an angle or bevel.

BEVEL

Bill of Material—A list of parts and quantities of those parts required in a certain operation, machine, or object of any kind.

Bisect—To cut or divide into two equal parts.

Bisector—A line which bisects another line or angle.

Bit Stop—An attachment used to prevent an augur bit from cutting below the desired depth.

Black Spruce—Found in the Southern States and Canada; light weight; reddish in color; though easy to work is very tough in fiber.

Black Walnut—Heavy, hard, porous, of a brownish color, marked by a beautiful wavy grain. Is strong, durable; used for small cabinet work, gun stocks, and interior decoration.

Blind (Arch.)—Something which obstructs the light or vision, as a screen or shutter.

Block Plane—A small plane used for finishing end grain.

Blow Holes—Hollow cavities in castings caused by the presence of air or gas in the molds.

Bluestone—Copper sulphate.

Board—Thin timber as distinguished from planks. Long and broad pieces of wood, two inches or less in thickness.

Board Foot—The unit of measure for lumber. One foot square, one inch or less in thickness.

Board Measure—The term in which quantities of lumber are distinguished and prices determined.

Body—The main portion of a pattern, casting, forging, or machine.

(To Be Continued)

SCHOOL CRAFTS CLUB OF NEW YORK CITY

Lloyd F. Stair

The School Crafts Club met for its twenty-third annual banquet on May 16, 1925, at the Cafe Savarin, near Grand Central Station in New York City. After partaking from a bountiful menu the club members listened to several speakers, most of whom are former presidents: Mr. A. W. Garritt, supervisor of shopwork in the New York City elementary schools; Mr. C. R. Mercereau, on the staff of the Brooklyn Technical High School; Mr. John J. Hatch, director of manual arts department, Normal School, Newark, N. J.; Mr. M. J. Corcoran, director of Boys' Vocational and Continuation schools, Elizabeth, N. J., and Mr. Philip M. Wagner, instructor in shopwork, Cleveland Junior High School, Newark, N. J.

Mr. Garritt's remarks brought out the situation in New York City elementary and junior high school shop work. In three years, 165 new schools have been built, 60 are under construction, 40 are planned with sites selected, and 50 are on plans alone. In a period of seven or eight years this indicates a growth with 315 new buildings. The size varies from nine to 51 classrooms. Two of the new buildings are senior high schools and one a teacher training school. All this means a growth in the manual arts department, for while three years ago there were 254 elementary shops, there are now 310. At the end of 1925 there will be 323. During 1926 there will be opened 40 new shops.

It is a big undertaking to open up many new shops, but it means that teachers will be working under better conditions with normal rather than swollen classes. Mr. Garritt told of an experience one young teacher had in changing from a suburban town to a New York City school. The work was so much heavier than he had formerly experienced that in spite of the larger salary he felt keen regret for changing. Since March, 36 new teachers have been hired, but loss from turn-over makes the increase only sixteen. Men from the trades, with teacher training under Mr. Young, are the steadiest entrants into elementary teaching, since college men look upon this branch as a stepping stone. New York City has the largest manual arts department in the country with a budget of $1,047,389 for elementary and junior high school work. The teachers are developing many different kinds of work for boys, and here and there will be found that which will match the best done elsewhere in our land.

Mr. Mercereau introduced his remarks with the changes in our idea of what the aims of manual arts are, from the time when it was considered the panacea for all ills. He feels that the demand for nicer furniture in our homes today traces back to training acquired in our shops and drawing rooms. Even the furniture making period in our work had its drawbacks, for all too often the teacher was so pushed to make a showy exhibition for the manual arts department that he was forced to do a great deal of the work himself or give all his time to the best workers to the neglect of the majority. Manual arts functions in a boy's life and every high school should have such a department.

Mr. John J. Hatch feels that we must strive to raise the standards of preparation for teaching in the manual arts field. The period where a carpentry union card was the only necessary qualification, is passing. Besides technical knowledge a teacher must possess personality, culture, and pedagogical training. Personality in shop work is important. Mr. Hatch is looking toward the day when shop teachers and academic teachers must possess the same educational qualifications. Manual training functions as a foundation to make vocational education stronger.

The manual arts teacher training department of the Newark Normal School was organized in 1922, and has one class of graduates in the field. Necessary for entrance to this course are high school graduation, passing of examinations in academic subjects, and recommendation.

The industrial arts as an important factor of the junior high school is going forward by leaps and bounds. Springfield, Massachusetts, has no grammar school with an eighth grade.

Mr. M. J. Corcoran has been a member of the School Crafts Club for fifteen years. During the first twelve he missed only one meeting. He believes it the obligation of every teacher to be active in such an organization. Elizabeth, N. J., will have four new junior high schools next year, with five shops in each. Mr. Corcoran is willing to prophesy that the industrial arts movement in the future will be centered on the junior high school grades, and that below these grades the handwork will be of an informational character. Mr. Corcoran believes that industrial arts teachers should not turn a cold shoulder to some practical constructional work in their shops for civic or school purposes as it is hard for business men on our boards of education to see so much valuable equipment not being used for practical purposes now and then. However, consideration must be allowed for the age of the pupils, in the quantity of such work to be turned out.

Mr. Philip M. Wagner feels that labor organizations can be used to help forward the industrial arts movement. Their leaders strongly endorse giving boys a chance to get an early start in finding out whether or not they have mechanical aptitudes.

NEW JERSEY VOCATIONAL AND ARTS ASSOCIATION

The ninth annual convention of the New Jersey Vocational and Arts Association met in conjunction with the New Jersey High School Teachers' Association at New Brunswick on Friday and Saturday, May 8 and 9, 1925. The sectional meetings relating especially to industrial arts were held on Saturday at the New Brunswick Junior High School. The following officers were elected for the ensuing year: President, Mr. Philip M. Wagner, Cleveland Junior High School, Newark, N. J.; Vice-President, Miss Clara H. Krauter, Girls Vocational School, Atlantic City, N. J.; Treasurer, Miss Ruth Culley, Continuation School, Plainfield, N. J.; and Secretary, Mr. Leonard Stolk, Continuation School, Paterson, N. J.

Manual Training Section

Mr. Fred Thompson, supervisor of special activities, Paterson, N. J., spoke on the subject "Manual Training and Its Relation to Life Interests." Viewed from a standpoint relating to other school subjects, manual training must contribute to living itself. We have critical comments to answer in efforts to reduce school expenditures, resulting in some localities in dropping the subject. Where manual training has failed, no greater educational principles have been involved than the use of tools. Ten years ago the vocational school got an impetus through the need of practical trade teaching for the World War. Manual training and vocational training each fulfil a need, and neither satisfies the other. We must guard against using poorly prepared and unenthusiastic teachers, and poorly organized courses. We must emphasize industrial information, tool processes, good technique, ability to read drawings, respect for industry, and appreciation of the workers' environment.

Projects should be chosen which develop mental growth, initiative, and good judgment. They must be interesting to the boy and have a monetary value. Boys should make a rough sketch to work from, list the necessary tools, determine proper material, compute the cost, and know where the material is obtained. Home mechanics should be taught in the shop with such problems as faucet repair and rescreening of doors. Problems have to be solved to do this, but where there is a will there is a way. Paterson has for one shop a full sized section of a house with doors, plumbing, shingling, etc. The boy must be considered more than the turning out of beautiful models.

Mr. Arthur F. Hopper, director of industrial and fine arts, Plainfield, N. J., had for his subject, "The Past Ten Years and the Next Five Years in the Development of Manual Arts." Good businesses take inventory, and decide what the future will bring forth. This is not done often enough in the manual arts. We should take more stock of our work, and not be satisfied with picking up a new idea now and then. Fifteen years ago one-half of 1300 towns and cities had some form of handwork. Three hundred of these gave less than one-half hour per week. Look around now, and you will find a remarkable advance. In 30 years before 1910 the advance in manual arts was slow. Educational leaders like Butler, Dean, and Richards got together, formed committees, and in three years there was a greater advance than in the preceding thirty years. Then something happened, educators looked to Germany and brought back the vocational education idea. Business men got behind this and the Smith-Hughes law resulted. This had a serious influence on manual training, and some manual training shops swung over to vocational training. To the rescue came Bonser, Dean, Richards, and Snedden. These men helped define objectives for manual arts, and to show that the aims of vocational education and manual arts were clearly separate. The war set back the manual arts advance. Talk started about economy, too many sub-

jects, and fads and frills. Schools in the middle west cut down their support of manual arts. It took Payson Smith and William McAndrews to get over to the public the need of manual training in the general scheme of the curriculum.

After the wane of the exercise and model idea, shops broke into the larger type of project—furniture. Attempts were made through exhibits, to draw attention to the manual arts department. This was not so good for the boy. Instances are known where teachers cut out the work and made the joints, leaving the gluing up only to the boy.

Something else was necessary; a break came through the advent of printing and sheet-metal. Mr. Clyde Bowman sponsored the idea of the composite shop to make the work more diversified in smaller places. This problem is a difficult one to handle and came upon manual arts too suddenly, finding teachers not properly prepared. The junior high school came in six or seven years ago and called for handwork and shops. This saved the day with a trend toward unit shops for different kinds of handwork. The trouble with the composite shop idea is that it requires a super-man to handle it in such a way that the resulting boy's work is not so much junk at the end of the year. Most teachers in small places, where unit shops are too expensive, must be satisfied with a very conservative type of diversified work. One way out is a composite metal shop, and a composite wood shop, with one teacher in each. This is a problem which must be threshed out in the next five years, along with problems of the time element and the constantly increasing size of classes. We should not drop altogether the diversified shop idea, but let it function where the teacher has the necessary ability, personality, and preparation.

We have also the teacher problem to consider. We are not sure whether the practical or the normal school training is the best preparation for teaching. The late Dr. Harvey of Stout Institute who made a survey, came to the conclusion that the most successful type of shop teacher is one who has had at least two years in high school, has learned a trade, and then has gone to normal or summer school to obtain his teacher's certificate. First of all he must be an able mechanic. However there is another way to look at the problem. A boy who graduates from high school and is mechanically inclined, also makes a good teacher after a thorough normal course preparation. Men who have had trade experience should complete their education to be at least ahead academically of the boys to be taught.

The vocational guidance aim as advocated by some does not have the significance claimed for it. It is hard to duplicate in school the conditions in industry. However it is possible through try-out courses to separate the mechanically inclined from the otherwise. There is also a tendency to drop from the fifth and sixth grades that form a handwork which requires the handling of tools with much degree of skill, and substituting the type of work advocated by Dr. Bonser and Mrs. Mossman.

When boys first become acquainted with manual arts, the work should be of a formal organized nature. It is wrong to start green boys on the diversified idea, because the work will be very inferior. Tool processes should be stressed for at least half a year. Industrial arts must now stand on its own merits and pick its leaders from the ranks. The right spirit must be developed among the corps of teachers. In five years manual arts should be a part of every boy's education.

Mr. Edwin F. Judd, instructor in metal work, Montclair, N. J., High School, spoke on curriculum making for manual arts.

After Mr. Judd's talk several topics were up for discussion. It was agreed that teaching personality is more important in a shop teacher than the method of his preparation: practical trade experience vs. normal training. Dr. Bonser's idea of handwork for the lower grades, while not firmly rooted in the east is getting a foothold in the middle west and west. In New Jersey the Bonser plan is followed in Trenton and other places. The progress of industrial arts thus far should not be jeopardized by the sending of larger classes to a shop than there is equipment for. Twenty-four is the maximum that one teacher may handle in shopwork successfully.

Continuation School Section

Mr. William Cochran, of Paterson, N. J., manufacturer of Jacquards, and a member of the Paris Inventors' Society, gave an instructive address to the continuation school group. By way of introduction he asked the teachers to think of the rapid advancement of the following inventions: the locomotive, electric light, electrical appliances, the automobile, the phonograph, and the aeroplane; and to also note the improvement in the world and society because of these inventions.

He stressed the fact that because of the many improvements, the boy and girl of today must have a better education to fit into society and the trades. Mr. Cochran believes that teachers should instill and develop the

PHILIP M. WAGNER,
President New Jersey Vocational Arts Association,
Newark, N. J.

thoughts of service, honesty, reliability, love for God and government.

Mr. Cochran stressed the point of developing proficient leaders and of quitting jobs so that employers could write good recommendations for their employees. He claimed it is an injustice for a manufacturer to keep a boy on a job that he is not adapted for. Trade unions should be educated to the fair play idea toward American boys, and not put up barriers to boys desiring to learn a trade, but foster and lend encouragement.

Mr. Reuther of the State Department emphasized the splendid and willing cooperation that manufacturers have given to continuation school officials toward solving the many problems confronting the boys and girls of this type of school.

Art Section

Miss Maud Hayman spoke on "Applied Design in the Elementary Schools.' Miss Hayman had pencil sketches to illustrate problems in perspective and design in the eighth grade. For the sixth and seventh grade work, she showed examples of elementary design in the decoration of note books and rattan rugs. For the lower grades Miss Hayman described how the children made animal posters.

Miss Jean T. Mitchell gave a talk on "Public School Drawing—what should it be?" Miss Mitchell illustrated her remarks very ably with blackboard sketches. Beginning with the first requirements needed in a child's vocabulary, she showed how simplified forms might be presented at first and later elaborated on as necessity demanded. The practical use of such material should help to unify standards in graphic illustration—a much needed feature in school art.

Home Economics Class Entertains Club. The girls of the home economics classes of the Cochran Junior High School, Johnstown, Pa., recently entertained 150 members of the Johnstown Rotary Club of Johnstown, Pa., at a luncheon served in the gymnasium of the school. The project of purchasing, preparing, and serving of the three-course menu was carried out by the girls. Addresses were made by Dale McMaster, principal of the Cochran school, by James Killius, director of vocational education, and others.

Mr. Matthews Honored. At a recent meeting of the Swarthmore (Pa.) chapter of the honor engineering society, "Sigma Tau," Mr. John J. Matthews, a graduate of the Swarthmore Engineering School, of the class of 1914, was elected to membership in the fraternity. The honor came partly by virtue of a contribution of Mr. Matthews while a student at Swarthmore, in the form of an original research thesis, and partly in recognition of his promotion to a position in the State Department of Vocational Education.

NOW, ARE THERE ANY QUESTIONS?

Basket and Raffia Weaving

Q. 512. I would like to know where I could obtain some information about the history of rattan and how it is prepared in sizes ready for the market; also, I would like to have a list of books on basketry and various types of weaving.—A. L.

A: There is not very much on the history of these crafts. They are minor and there is no extensive literature concerning their history, as there is concerning the history of furniture, etc.

Basketry Materials and Sources—Hubbard's Basket Willows, 1904; price, fifteen cents; issued by the Government Printing Office, Washington; Production and Consumption of Basket Willows in the U. S, 1909; price, five cents; issued by the Government Printing Office; Lamb's Basket Willow Culture, issued by the Government Printing Office; Papper's Ancient Basket Makers of Utah, 1909; price, ten cents; American Museum of Natural History; Roseberry's Illustrated History of Indian Baskets and Plates in California, 1915; price, fifty cents; issued by Mrs. T. A. Roseberry, San Francisco, Calif.; Stephen's Basket Willow Culture in New York State, issued by the State College of Forestry, Syracuse, N. Y.

Cane Weaving—Weaving and Other Pleasant Occupations, Polkinghorne, $3.50. Published by Brentano's, New York City; Cane and Rush Weaving on Sloyd Principles, Little (1897).

"Checking" of Shellac

Q. 518. What will cause shellac to check like varnish? What will cause shellac to turn white after the finish has been on the furniture for a year or more?

A: The causes of checking in shellac are manifold, the principal one of which is due to the fact that rosin has been used as a gum adulterant. Exposure to continued heat in a warm room, too many coats applied over improperly dried under coats, or the application of a touch-up coat over a surface which has been oil rubbed for finish and not properly cleaned off.

Shellac will turn white any time, any where, any place, provided it is affected by some kind of moisture. Shellac has no resistance whatever to the latter, especially the highly purified forms which we get now-a-days, which have had practically all of the natural wax in the original lac removed. As I have said so often in these columns, shellac should not be used a a finishing material, but merely as a sizing or priming beneath more durable products, in spite of the fact that many factories are turning out furniture completely finished in shellac. You should realize, however, that this is the direct result of a demand of the times calling for high speed production, a fair finish, good enough for quick sale and absolutely no consideration of the durability of the completed goods. It is regretable that this condition exists, but I find among reputable furniture companies that they realize that buyers in general do not purchase furniture as did our grandfathers but insist on a product in style and which may be renewed five years hence, or thrown away because the purchaser has tired of that particular design or finish.

Finishing a Walnut-Cedar Chest

Q. 525. Will you kindly tell me the cause and remedy for the following:

My class made some beautiful walnut veneer, cedar lined chests this winter and I obtained a good finish on the outside, but on the inside of the lid where the cedar nearly touches the walnut, the varnish has become sticky and never seems to be dry. I finished the chest as follows: First, I raised the grain with water; second, I sanded it down; third, I applied oil stain and allowed overnight to dry; fourth, I put on filler and allowed 48 hours for drying. Then, I applied flat varnish and after allowing several days to dry, I put on another coat. Now on the outside, the finish is perfect and seems to be dry and hard, but just underneath the lid, or where the lid comes down on the walnut, it remains sticky.—L. T. W.

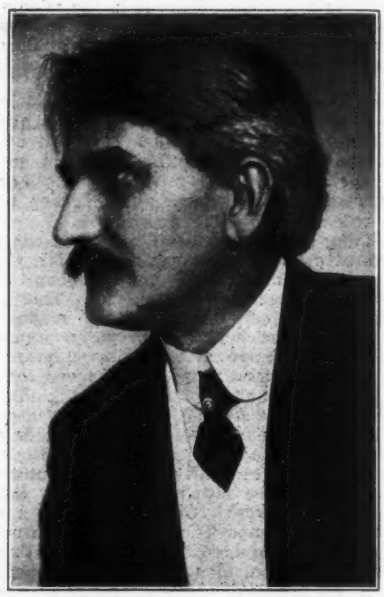
A: Your treatment for the cedar chests, walnut finish, was fairly correct. It would have been far better, however, to have used a water stain. Again, you should have used a coat of shellac from stock reduced with an equal volume of alcohol over the oil stain followed by drying and sanding with a split 6-0 paper. This should then have been varnished according to your practice.

Varnish should never be used on the edges of drawers or chest lids where the surfaces are not exposed to the constant drying action of the air. It is far better factory practice to use shellac on these portions, cutting in sharply to the varnished face. After thoroughly drying, the shellac may be sanded down smooth with a split 6-0 paper and crude petroleum oil and when wiped up with a cloth is then ready for use, and as far as my experience extends has not been known to be subject to any objections.—Ralph G. Waring.

Shop Arithmetic

Q. 531. I am looking for a book on shop arithmetic, suitable for use in the eighth grade, and also one for high school manual training classes. We teach nothing but wood-work, cabinet-making and lathe work.—C. H. C.

A. The following books will be found useful for the purpose: Vincent's Vocational Arithmetic, $0.55, Houghton Mifflin Co., Boston; Kiggen's Practical Business Arithmetic for Trade, Prevocational and Continuation Schools, Macmillan Co., New York; Roray's Industrial Arithmetic for Boys, $0.75, Blakiston Co., Philadelphia; Cobb's Elements of Applied Mathematics, $1, Ginn & Co., Boston; Wentworth, Smith & Harper's Fundamentals of Practical Mathematics for High and Vocational Schools, $1.20, Ginn & Co., Boston.



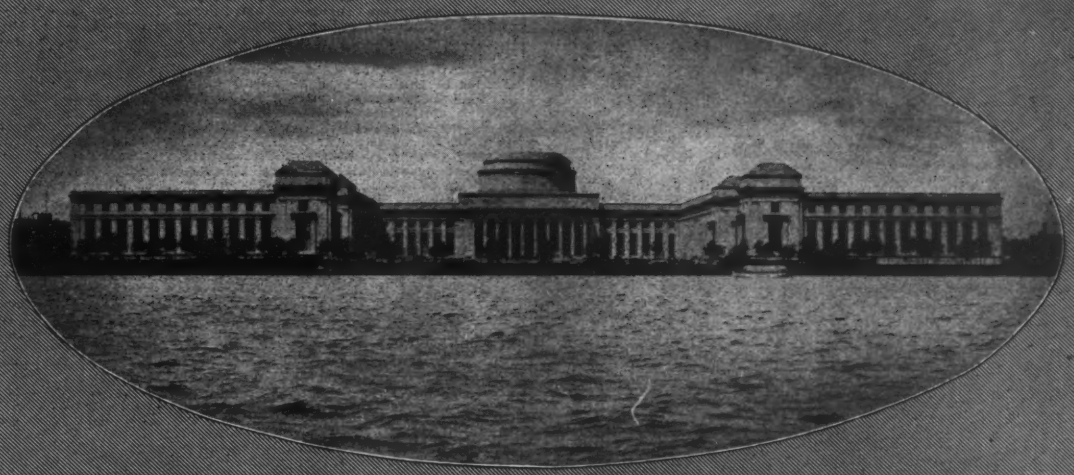
HUGO B. FROEHLICH.

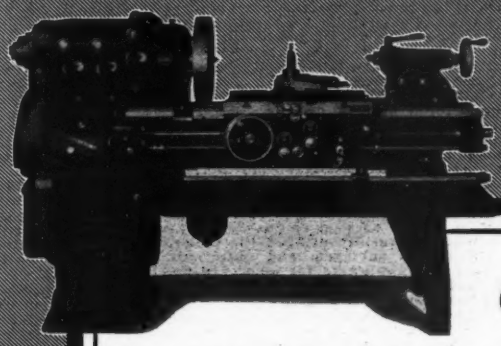
American art education lost one of its staunchest champions on June 11th when Hugo B. Froehlich suddenly died at Newark, N. J., as the result of heart failure.

Mr. Froehlich was born in Cincinnati in 1865, and was a graduate of the Central High School, Dayton, and of Pratt Institute, New York City. For many years he has been director of manual arts and art instruction of Newark, N. J. He has been widely known as an author of art textbooks and a frequent contributor to school and art magazines.

He has been successively an official in various educational organizations, particularly president of the Vocational and Arts Association of New Jersey, and president of the School Crafts Club, New York City.

To Establish Building Trades School. Plans have been discussed for the establishment of a building trades school at the Delaware School, Syracuse, N. Y. The course, which is for all apprentices in the building trades, will cover a three-year period and will be supported by both builders and trade unions. For the present the courses are to be confined to the continuation and evening schools but the future development will carry the work into the vocational schools where day sessions are maintained.





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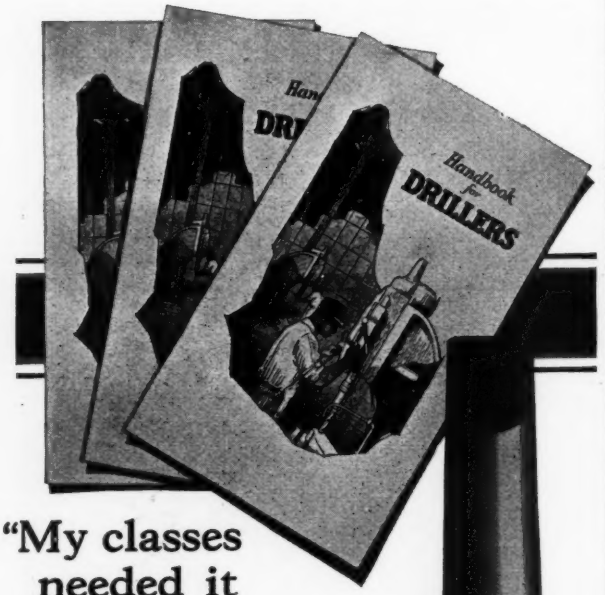

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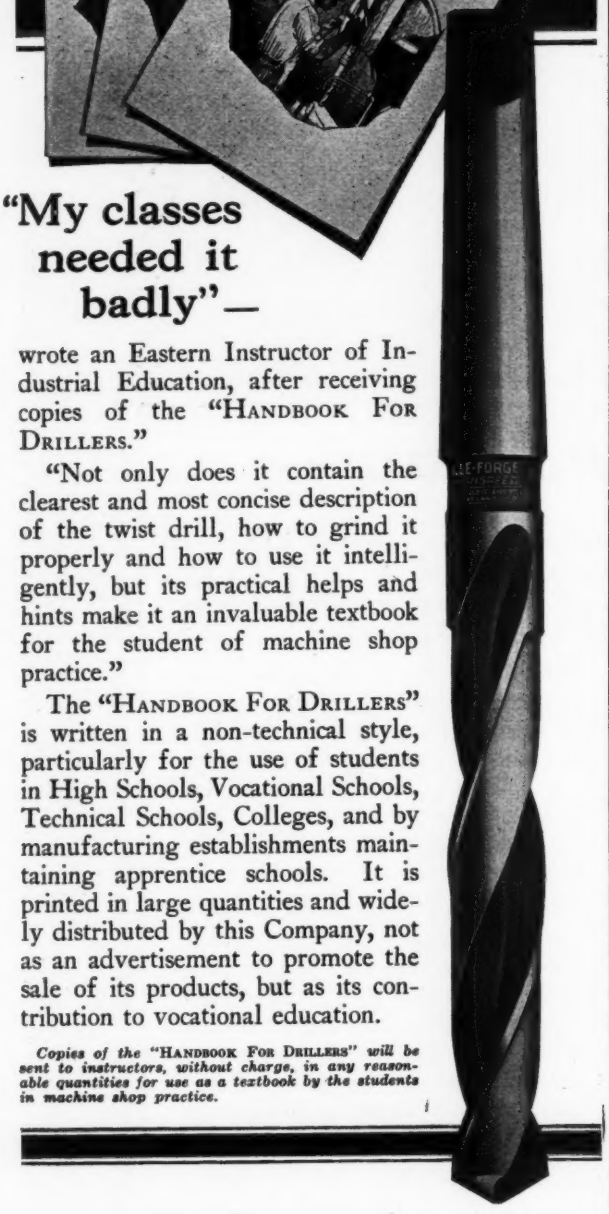

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TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

NEWS AND NOTES FROM THE FIELD

The extension service of Middlesex County, Massachusetts, offered a liberal number of prizes ranging from $1 to $5 for the best posters on plant spraying. About 725 posters were received. Fred Reed, head of the art department at Framingham Normal School; F. A. Munson, of the bureau of markets, and Mrs. N. P. Draper of the extension service, acted as judges.

The Port Huron, Mich., board of education has decided to erect a model home in which domestic science is to be taught. In commenting thereon the Port Huron Times says: "There is no place in all the world where training and education in home making can be so well secured as in a home. If it has become the part of wisdom for the schools to attempt scientifically to help our homes to make good home makers of the girls in our public schools, it is logical that the work to be most effective must be the actual work that is to be done in the home and under conditions as nearly as possible approaching those which will be found when serious work of that kind may be taken up."

The Transit Country Club of Buffalo, N. Y., ordered 100 bird houses from the Opportunity School which is in charge of Stewart F. Ball, director.

Safeguarding Health of Workers. That American industry leads the world in protecting the health of its workers is evident from the great strides made in this field by industrial establishments in the United States, as reflected in a survey of the cost of health service in industry now being made by the National Industrial Conference Board, in New York City.

The findings of the board show that on the average about sixteen per cent more money per employee is being spent by industry in medical supervision than was spent four years ago.

Of 446 establishments covered by the survey of the board, 255 report that applicants for employment are physically examined, and most of these plants use the result of the medical examination as a guide in selecting the proper work for the applicant. In many plants, employees as well as executives, are re-examined at intervals. Much care is exercised in safeguarding workers from contact with infectious diseases.

It is found that damage to health and to the productive capacity of the worker is obviated by physical examinations. Not all applicants for work are in perfect health and many have minor ailments which can be corrected, and which make for a sound, hundred per cent worker in place of one previously able to do little or no work. Physical examinations also uncover chronic defects which do not entirely bar the applicant from work but require that he be given a specific kind of work which he can do with the least injury to himself.

In addition to the care taken of employees in accidents, many industrial plants give what aid they can in case of sickness, with a view of cutting short the period of illness and returning the worker to his job as soon as possible. At the present time only eleven plants have discontinued the policy of medical examination out of 446 surveyed, and objections to examinations by employees and applicants for work are practically nil.

A model store for the benefit of students in commercial classes has been installed in the Bosse High School, at Evansville, Ind. The store sells school supplies, gymnasium equipment and various other articles at cost. It is the belief of the principal of the school that practical experience in financial transactions can only be obtained through actual contact with the tangible features of the store.

In the metal trades industry half of the positions "at the top" are held by college graduates. A survey recently made covers 318 plants, employing a total of 106,500 persons. Men holding supervisory or technical positions in these plants number 16,002, including 2,742 college trained men, and about one-fifth of these (20.2 per cent), hold 555, or 45.7 per cent of the 1,213 higher executive positions in the general offices of the 236 companies owning the 318 plants under observation.

Trade Class for Sheet Metal Workers. The sheet metal employers of Omaha have furnished a room in which the Omaha board of education provides instruction for the employees in the subjects of mathematics, drawing and science related to the sheet metal trade. Arrangements have also been made for the use of a private commercial shop for teaching trade operations.

Iron-Moulders' Class. The class in iron-moulding at Omaha, Nebraska, performed some unusual work during a one-year study of metal mixing, drawing and mathematics related to foundry practice. The class was the first to be organized in the extension of the Omaha schools to the Omaha Labor Temple where trades are taught.

Class for Printing Apprentices. A class in type fundamentals for printing apprentices has been conducted in a short period in the Whittier Junior High School at Lincoln, Nebraska. For the 1924-1925 season, classes for printers were organized in fundamentals, presswork and paper classification for printers. The Lincoln schools employ as evening teachers some of the leading men in the printing industry.

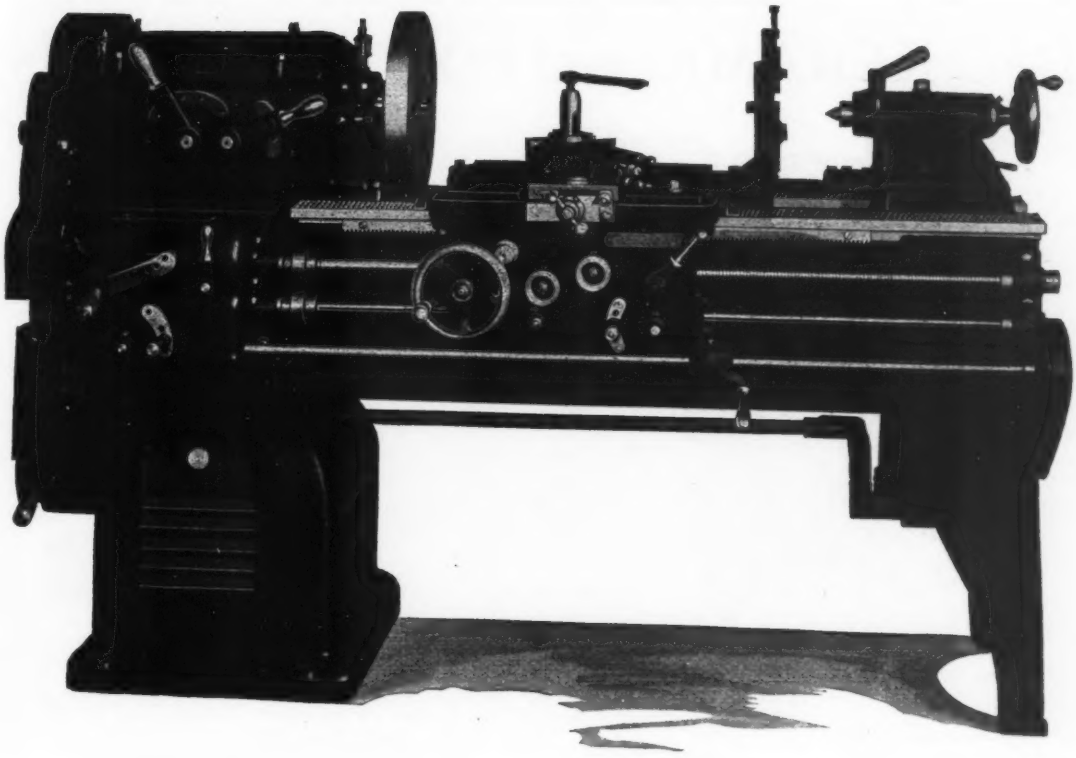
Vocational Rehabilitation Work. The State Board of Vocational Education of Nebraska re-trains men and women disabled by accident, injury or disease. One of the students, who has been confined to a wheel chair for many years because of rheumatism, has been given training in gesso, polychrome, and other forms of decorative art. She has progressed rapidly and has now made arrangements for the disposition of her products.

Trophies Offered for Yacht Races. The Evening Herald of Los Angeles, California, has offered four beautiful trophies to the winners in the third annual miniature yacht races to be held on Saturday, June 20th, for boys under 20 years of age. Three cups will be awarded to the winner of the first, second and third place with craft measuring between 34 and 36 inches over all, and not more than 600 square inches of sail area. Another trophy will be given to the winner of a race for all boats measuring under 34 inches, and sailed by an entrant attending an elementary school.

The trophies are in the form of three large silver cups, graduating in size for the first, second and third place winners of the 34 to 36-inch class event, and a medium-sized cup for the winner of the race for boats under 34 inches.

The annual classic will be staged under the auspices of the Southern California Yachting Association, with flag officers of the Los Angeles Model Yacht Club, other California clubs, and the Los Angeles Athletic Club officiating.

(Continued on Page 22a)



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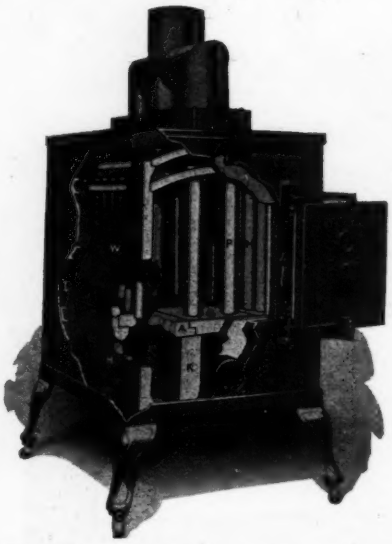

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(Continued from Page 20a)

Manual Arts Work Systematized. The supervisor of manual arts at Greenfield, Mass., has organized and systematized the work of the grades and high school so that there is a continual logical progress from the seventh grade through the high school, giving the boy an opportunity to find his special aptitude or liking.

The work in the manual training department has been of the nature of group work for the seventh grade, with actual work in school problems for the older boys, and also for each boy as desired. The toolroom and printshop have been remodeled and rearranged. Forms for the entire school system are printed in the printing department.

In the wood working department, medicine cabinets, tables, chairs, toys, tool chests and a variety of other objects have been made.

The work of the mechanical drawing department has been seriously handicapped due to limited quarters but the work has been exceptionally successful.

Annual Vocational Banquet. The annual banquet of the men of the vocational department at Erie, Pa., was held on April 30th. W. J. Groschke, director of vocational education, acted as toastmaster. At the banquet, Senator M. E. Griswold gave an address on the growth of vocational education in Erie, and explained a bill seeking to amend the vocational law by changing the manner of disbursement of federal and state funds. Should the law pass, Erie would receive $8,000 to $10,000 more in federal and state aid.

Mr. Whitney talked on the characteristics of teachers, and Mr. G. O. Moore cited the importance of vocational education in the schools.

Vocational Appropriations Passed. The Missouri legislature has passed the appropriation bill which is intended to match the federal grant in full, the total amount being $440,000 for the biennial period. The fund is used to reimburse school boards in cities and towns where courses in agriculture, home economics and trade subjects are offered. It means that a total of $880,000 representing state and federal subsidy will be used in the promotion of vocational education in the state.

Re-establish Vocational Courses. Two additional instructors, one for domestic science and one for manual training, will be employed next year at Fort Benton, Mont. These branches were eliminated from the course several years ago because of the financial condition of the schools.

Select Trades to be Taught. The apprentice training committee of the board of education at Syracuse, N. Y., has begun the selection of the building trades which will be taught next September in the new industrial trades school. Supervisor D. M. Kidd has outlined a course of six lessons for those who will instruct apprentices. Plumbing, carpentry, brick-laying, plastering, painting, and decorating are among the trades which will be taught.

Survey of Mechanics Institute. President C. F. Lomb, of the board of directors of Mechanics Institute, Rochester, N. Y., has announced the appointment of a committee of three experts, who will make a survey of the Institute for the purpose of determining the future policy of the institution. The members of the committee selected for the work are: Chairman, D. S. Kimball, dean of the College of Engineering, Cornell University, Ithaca, N. Y.; Frederick P. Keppel, president of Carnegie Corporation of New York, and C. R. Dooley, personnel director of the Standard Oil Company of New Jersey.

The findings of the committee are expected to determine the position with such institutions as Mechanics Institute should hold in the educational systems of the respective cities and the definite contributions that these institutions are to make to their students and to industrial, commercial and home activities into which the students will go. The experts will come to the city uninstructed and unprejudiced and will study the educational work being done in the city, and as a result of this study, and a knowledge of similar situations and work in other communities, will determine what part Mechanics Institute will take in the educational growth of the city.

Prize Competition in Jewelry Design. The second Cartier prize competition in jewelry design was held on June 10th, under the auspices of the Art Center of New York City. The competition provided for a first prize of $1,000, plus fare to and from Paris, a first honorable mention of $100 and a second honorable mention of $50.

American Home Economics Meeting. The American Home Economics Association will hold its forthcoming annual meeting August 1 to 6, at San Francisco, Calif. The present meeting will be the eighteenth which the association has held, and it will take up the questions of sources of income for the sections, and the development of closer relations with home economists in Canada and other countries.

Offer Practical Arts for Retarded Children. Since September last, the school authorities at Falmouth, Mass., have conducted a special school for children unable for mental or physical reasons, to keep up with their classmates. The scheme of instruction provides for a variety of practical arts work, including sewing, embroidering, reed work and woodwork. The children recently held an exhibit of the work accomplished which comprised sewing and cooking products of the girls, and tables, chairs and wicker articles as the work of the boys.

Apprentice Banquet. On March 23rd the apprentices of the Vocational Continuation School at Sheboygan, Wis., enjoyed a banquet at the association of commerce rooms. About 125 persons were present. Many of the boys and the employers gave talks.

Summer Courses in Forestry. The summer school of the New York State College of Agriculture at Cornell University, Ithaca, N. Y., will offer this summer a wide range of subjects open to teachers who desire to devote some part of the summer to professional improvement. Two courses in forestry will be conducted by Prof. Ralph S. Hosmer, head of the department of forestry at Cornell, which are designed to assist teachers in teaching nature study and biology in the lower grades. The courses aim to give the student an understanding of the forestry field, its scope, relations to agriculture and the applied arts, and its bearing on the broad problems of conservation and wise use of natural resources.

Budget for Vocational Guidance Bureau. The Vocational Service for Juniors, a private organization in charge of vocational guidance in Manhattan schools, and of placement for youthful job-hunters, recently submitted a report to President George J.

(Concluded on Page 24a)

Do not fail to send for this New Booklet

This attractive folder in color is just off the press. We will gladly supply you with a copy upon application. It tells about the new "Prang" Tempera colors, which as you know, differ from all others by being based on the color circle.

Four pages are given over to explaining the advantages of such a systematically arranged palette, the sound reason behind the entire system, as well as brief outlines touching different ways in which the new Tempera colors are being used most successfully today.

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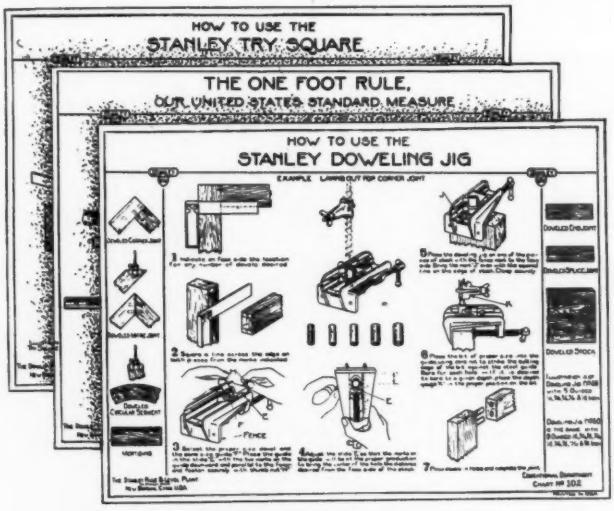

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(Concluded from Page 22a)

Ryan of the New York City board of education. The report included an account of the organization's work, and a program and estimated budget for the service as an integral part of the school system.

Course in Gluing of Wood. The eleventh instructional short course in gluing of wood was given at the U. S. Forest Products Laboratory, Madison, Wis., during the week of April 20th. It was attended by nineteen representatives of the glue-manufacturing and wood-using industries, comprising those engaged in the special fields of piano manufacturing, furniture manufacturing, glue handling and sporting goods.

Assistant Supervisor of Art. The newly created position of assistant supervisor of art has been included in the budget of the Chicago public schools for the year 1925. The new position has been created to take care of the work involved in the planning and supervision of art in the junior high schools.

Cooperative Industrial Courses. A vocational course of the cooperative type is offered at the Williamsport high school, Williamsport, Pa., under the directorship of Mr. G. H. Parks. The course consists of two years of straight academic work, followed by two years of vocational work. Four trades, cabinet-making, machine shop work, pattern making and electrical installation, are taught. During the last two years, each one of the sixty boys in the course alternates between one week in school and two weeks in employment. Each boy is paid twenty cents an hour during his junior year and 25 cents in his senior year, and upon graduation is placed for one year as an apprentice at forty cents an hour. The course costs about $120 per year, per pupil, or $15 more than the academic course, and the Smith-Hughes subsidy pays about $60 of the cost.

Plumbing Course Re-established. Plumbing, which was previously taught in the schools of Cincinnati, O., two years ago, has been replaced in the course of study of the vocational department. A class for apprentices has been established, the work to be conducted under Smith-Hughes auspices.

Practical Printing Course Offered. Thirty boys have enrolled in the printing course offered at the Allentown high school, Allentown, Pa. The department has a complete printing shop and is rated among the best in the country. It is conducted the same as an ordinary printing establishment, the boys making out time sheets and the department keeping records of the cost of each job.

All of the printing of the school system is done in the high school shop. Last year the boys did work estimated in cost at $3,627. The material cost approximately $800, and the work includes jobs for all the schools of the district.

Vocational Teacher-Training Conference. A vocational teacher-training conference will be held during the week of July 20th to 24th, at the Iowa State College, Ames, Ia. At the conference, every phase of vocational education will be given attention, including agriculture, home economics, and industrial education.

The round table session on industrial education will be led by C. F. Klinefelter, of the Federal Board for Vocational Education. It will include discussions on the aims and objectives of manual arts, and a study of the responsibility of the teacher in the development of such forms of industrial education as evening school work, part-time education and trade instruction. The matter of industrial arts for the small city and the responsibility of boards of education in trade extension education will also receive attention. Among the speakers will be Dr. William McAndrew, Chicago, Ill.; Dr. Thomas D. Wood, Teachers College, Columbia University, New York City; K. G. Smith, state supervisor of industrial education, Lansing, Mich.; C. M. Miller, director of the Kansas State Board for Vocational Education; Mr. B. C. Berg, superintendent of schools, Newton, Ia.; Wm. J. Bogan, assistant superintendent of schools, Chicago, Ill., and W. H. Bender, department of vocational education, Iowa State College, Ames.

Teacher's Widow Receives Compensation. Mrs. W. H. Eubank, widow of the late McKinley school manual training instructor who died from injuries received at Kenosha, Wis., will receive the sum of $5,600 from the board of education as compensation for the death of her husband. The compensation will be payable at the rate of $18 per month for the next 26 years. The settlement was the result of a decision of the Wisconsin Industrial Commission, which had ruled that the board owed the widow compensation in spite of the fact that she had an income.

Scholarship Fund. Graduates of the two-year course at the Lindblom high school, Chicago, have as their aim this year the provision of scholarships that will enable other students to proceed beyond two years of study at the school. The club of twenty girls desires to provide for deserving pupils the school advantages they have been obliged to forgo.

Building for Auto-Mechanics. The vocational school board of Wisconsin Rapids, Wis., has asked for an appropriation of $6,500 for the construction of a one-story building for classes in auto-mechanics.

Prevocational Course. The school board at Corry, Pa., has voted to discontinue agriculture in the high school and to replace it with vocational training. At present 22 boys have signified their intention of enrolling in the course.

Memorial School to Be Erected. Mrs. Florence A. Brewster has offered to give $50,000 to $75,000 for the construction of a vocational school at New Lisbon, Wis. The school will be a memorial to her late husband, Dr. Henry W. Brewster.

New Vocational Schools. Two vocational schools are in process of erection at Miami, Fla.

New Courses. The school board of Miami, Fla., has purchased equipment for the teaching of carpentry, sheet metal, auto-mechanics, electricity, plumbing and plastering.

Mr. Maurice F. Feist, a degree graduate of the Stout Institute, Menomonie, Wis., died on April 15th, following an operation. Mr. Feist was teaching in the public schools at Detroit, Mich., at the time of his death.

Mr. William M. Feist Janesville, Minn., has been appointed to teach in the Detroit, Mich., public schools for the next year. Mr. Feist has been an instructor in industrial work in the Janesville public schools for the past seven years.

Miss Katherine L. Chase, supervisor of art in the public schools of St. Joseph, Mo., died on April 15th, in a St. Joseph hospital, following a short illness of pneumonia. Miss Chase came to St. Joseph at the beginning of the school year last September. She received her training in the Froehlich School of Art, and had taught in a number of school systems before coming to St. Joseph.

Associating with Great Minds

THE-BOY-AT-THE-TYPE-CASE to-day is the man of knowledge to-morrow. Master minds are his teachers. The copy he is setting to-day may have been written by *Shakespeare* more than three hundred years ago; his lesson to-morrow may have been written by *Victor Hugo;* the next day will, perhaps, bring copy from a modern writer, or from the editor of the school paper. Each project he undertakes is different, and each brings its new thoughts and inspirations.

The-boy-at-the-type-case soon realizes the importance of correct spelling, paragraphing, punctuation, capitalization, and word arrangement. To him language rules are tools which he must use, and use properly, to build his finished product. The building of a beautiful piece of printing requires the application of thought, skill, and artistry, governed by the rules of grammar, English, and arithmetic. Surely such a combination makes Printing one of the master tools of education.

The expense of installing printing in your schools is no more than that of other manual arts subjects. There is a printing outfit for every type of school. Write, giving details regarding the kind of school you hope to equip with printing, and let us send you full information regarding all details of installation. If desired, a representative of the American Type Founders Company, from its nearest Selling House, will visit you for a personal interview. The school year is well under way—write to-day.

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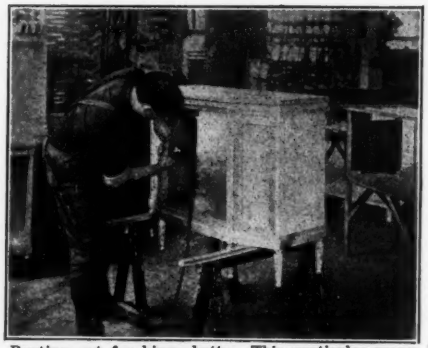
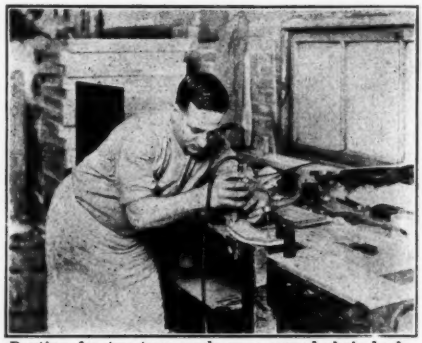


Routing out for hinge butts. This particular manufacturer says: "Your machine, which cost me $42, has saved me $700."



Routing for two-tone work on a curved chair back—the Carter Router is used here with veining guide.

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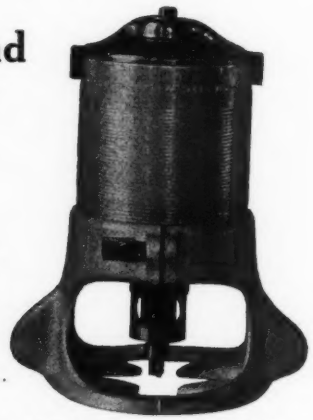

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WHAT'S WRONG WITH THE MANUAL ARTS?

Dear Editor:

Your editorials in the April number of the INDUSTRIAL ARTS MAGAZINE hit me along a line of thought which gave me an inspiration to write a few words myself on the manual arts instructor and his problems. I should like very much to hear discussed, by someone with a wider range of experience than myself, the question "What is wrong with the manual arts?" So many things are arising in the manual arts field these days, that we are sometimes led to believe that we are behind the times, unless we offer in our courses everything under the sun.

One of the greatest difficulties in the manual arts and industrial education field today is the lack of sympathy and understanding by the school authorities of the problems which so often come up in that field.

The country is full of the kind of school authorities who know practically nothing about the manual arts but still put up a bold front and criticize everything than an honest, conscientious instructor tries to do. They expect a man to turn out work with a group of boys comparable to work done by skilled labor in the shops and factories, when the most they should expect is that the boys learn the bare fundamentals of tool processes and simple shop operations by doing such jobs as is within the range of their mental ability and unskilled hands to produce.

I do not think it is the duty, nor do I think it possible for an instructor to develop a highly skilled workman out of a high school boy. In the first place the boy, if he should happen to have the natural ability, is not mature enough to cope with the problems which ordinarily come up in a highly complicated piece of work, and the instructor cannot spend his time during class hour with one student. Sometimes he may have twenty or thirty with whom to spend sixty minutes.

It is very easy to sit at your desk, hook your thumbs in your vest, look wise and tell how things ought to be done and what should be the objectives and aims of a good course in manual arts. It is entirely another matter to carry out some of those things.

I believe one of the prime reasons for the weakness in the manual arts in so many of our schools, is that the people in charge of those schools have had no education at all along these lines. In making out their courses of study they think of the manual arts department as a place to put boys who are no good in other school work and as a place to dump their overflow from other classes. This is a regrettable situation but is true nevertheless in many schools. All knowledge they possess of manual arts is what they have absorbed by observation, and probably very little of that. Many of them do not know the first thing about the problems involved in this line of work although they may have a string of degrees a column long attached to their names.

This is probably due to the fact that the manual arts is a comparatively new field in education, but in spite of this fact it has come to be recognized as one of the most important courses in our general educational system and for that reason there should be such cooperation on the part of school administrators and manual arts men that the school would be benefited and stronger courses built for the good of the community at large.

Manual arts men are to be congratulated, however, on being brought to the front more and more through their arts associations. State departments of education in most states are waking up to the fact that the manual arts have become a very important factor in their educational system and are doing more every year to standardize and enrich the courses in this work.

Another glaring weakness, not altogether the fault of school men, is the fact that there are so many teachers in the manual arts field who should not be classified as such at all and who should not be allowed to usurp the positions of truly qualified manual arts teachers. I refer to two classes of teachers: those who have had other professional training and in order to get a little larger salary take an elementary course during the summer and call themselves manual arts teachers. The other class is composed of journeymen in the trades who get positions through personal or political influence and teach on a permit issued by the city superintendent of schools, sometimes going to summer school later as convenient. The latter class of teachers may or may not develop into good instructors in their various departments. But they should not by any means be allowed to teach without their professional training, as these are usually the kind of men who lower the standards of the profession through lack of professional pride and indifferent social standards.

This practice of hiring unqualified teachers has done more damage than one can estimate to the manual arts as well as working an injustice to the qualified manual arts teacher.

The thing for us to do is to get behind our manual arts associations and organize so that we can have an influence in all general educational policies which affect our schools for the better improvement and efficiency of our shop classes. Then the time will not be far off when we can say, we are putting across a real job in practical education.—S. Strand.

A COMMENT ON TRY-OUT COURSES

The following letter has come from a subscriber to the INDUSTRIAL ARTS MAGAZINE commenting on the article of Professor Arthur Payne's in the May issue of the INDUSTRIAL ARTS MAGAZINE:

Dear Sir:—

You ask too many pertinent questions. You're moving along too speedily in thought for present-day advocates of "try-out" courses.

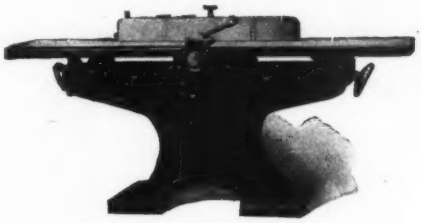
Be careful, or you will drive that nail completely home—you are hitting it on the head so regularly.

Don't you know that periodically the school system of this great country must develop a new handle by which parts of it may be whirled around and made to appear to cover a large area more efficiently. I am shocked at you. Fancy asking such things.

You should know that cabinet-makers, pattern-makers, printers, machinists, electricians, draftsmen, and auto mechanics are of the chosen race. Why compare them with such unimportant people as bakers, tailors, painters, engravers, shoemakers, etc.?

What matter what kind of bread we eat, what clothes we wear, how we protect our house from the elements, so long as our furniture is beautiful to look upon, our cars in perfect adjustment,

(Concluded on Page 29a)



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(Concluded from Page 26a)

and our daily paper contains glaring headlines in two-inch type of the latest murder?

Dear, oh dear. What shall we do? We'll all lose our jobs if you talk like that. Please, Arthur, desist.

However and nevertheless, here's hoping that you have more material on the subject of try-out courses, such as is published in the current issue of the INDUSTRIAL ARTS MAGAZINE, and may it be broadcasted, and repeated, and complicated and triplicated, and printed in every available publication, so that the self-satisfied exponents of try-out courses may yet awaken to the fact that six weeks of this and four weeks of that is little short of crime, except it be conducted under the kindergarten title of "busy-work," for that is about all it is.

Seems to me that the trouble with these try-out courses is the fact that at the head of our educational institutions are academically trained men, whose vision is so broad that there is no depth to it, or at least it is not penetrative enough to see the depth of various industrial subjects. They fail to realize or recognize that there are available many well trained men and women better able than themselves to design courses which really would "try-out" boys and girls, which would really present to them the industries as they are and not as they are shown to be in six-week courses of machine shop, electric wiring, and so on, conducted under nice clean shop conditions, by nice clean shop ladies and gentlemen, with John knowing whether he tries or not, dinner will be ready when he gets home. When he is made to realize that next week's meals depend on this week's application and industry, then we shall get him to understand the value of try-out courses, and then he will demand those courses tell him the whole truth about industry—of what will be expected of him, and what he may expect in return.

Here's wishing strength to your pen.

(Signed) F. H. WILDE,
Instr. Manual Arts, Selma Union High School, Selma, Calif.

NEW BOOKS

English for Printers

Unit II, Fundamentals of English Grammar; Unit III, Punctuation and Printers' Marks. Paper, 8 vo., 90 and 114 pages, respectively. United Typothetae, Chicago, Ill.

These two latest additions to the Standard Apprenticeship Lessons for Printers will be welcomed by every teacher of printing. As in the case of the earlier lessons, the booklets are complete, and authoritative, and bear evidence of long continued use under practical working and teaching conditions. The lessons in grammar take up the parts of speech and sentence construction; the lessons in punctuation embrace not only all the rules of using the accepted marks, but also capitalization and abbreviations. If every trade could have as well considered and fundamentally correct texts as the printers have in this series, the problem of vocational texts would be solved.

Manual of Style

Of the University of Chicago Press. Cloth, 12 mo., 391 pages. Price, $3. Published by the University of Chicago Press, Chicago, Ill.

Since 1910, when the second edition was published, this Manual of Style has been a frequent and satisfactory reference for settling finer problems of style in the office of the Magazine. That second edition—the book is soiled and thumbed but still sturdy—had the merit of brevity, clarity, and accessibility, and was thoroughly dependable. The present, eighth, edition has grown into a comprehensive and authoritative volume, as complete as the style book of any one office may become without being unnecessarily encyclopedic. Teachers of printing and of English will find the rules of composition reasonable and complete, and quite precise enough for the most careful stylist. A section entitled "Hints to Authors, Editors, and Readers" contains a large amount of useful facts and suggestions on manuscripts, proof reading, illustrations, indexing. A glossary of technical terms and a very carefully selected series of type specimens complete the book.

Artistic Alphabets

By E. L. Koller. Cloth, octavo, 347 pages. Price, $5. The International Textbook Co., Scranton, Pa.

This book outlines a course of study in lettering for the show card and sign letterer. Part one takes up the fundamentals of letter formation and of pencil drawing and brush lettering. Part two proceeds to an explanation of the Gothic and Roman letter styles and their uses in card writing. Part three takes up the italic and text letters and ornamental letters and initials. Part four is devoted to modern letter forms and elements of spacing, shading, capitalization and punctuation. Part five gives the reader an insight into the fundamentals of decorative ornament and suggests a wide variety of simple ornamentation which the ability of average sign writers and the present taste of sign buyers seem to demand. Teachers and students of sign writing will find the book useful because of the very excellent collection of classic and modern alphabets which it contains, and because of the useful directions for layouts, arrangement, and practice plates which it offers. The first half of the chapter on ornament is the weak spot in the work. It could be made far more useful, if a series of parallel plates showing the original and the simplified adaptations were introduced in place of the present plates which contain much figure work that is altogether unsuited.

Occupational Therapy

Louis J. Haas. Cloth, 8 vo., 409 pages. Price, $6, net. The Bruce Publishing Co., Milwaukee, Wis.

Occupational therapy came into wide prominence during the recent war as a result of the remarkable work of human reclamation carried on in the military hospitals of the several leading nations. The work had been going on for several decades before the war, but the results had been of interest only to professional workers. In the present book one of the American pioneers in occupational therapy offers the results of his long experience in handling male patients suffering from nervous and mental ailments. The book divides itself, naturally, into two major divisions: Part one takes up the problem of treating patients by means of curative occupations; part two describes the several crafts which can be employed and shows in detail the modifications in processes, materials, design, and finishes which other workers have developed.

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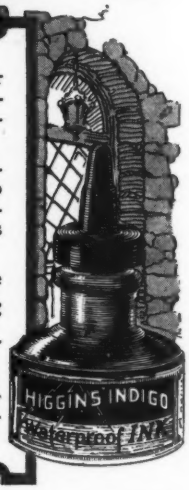

HIGGINS' Drawing Ink

The author makes no pretensions of medical or psychological functions to be undertaken by the therapist; these duties belong to the doctor in charge of each case. He rather shows how the department of therapy is to be organized and conducted, and describes quite fully how each of the crafts is to be carried on. The crafts included are surprisingly varied, ranging from basketry and raffia work to concrete construction, brush making, caning, jewelry and art metal work, carpentry, cabinet work, binding, weaving, etc.

Many of the methods and modifications in the use of tools and materials are original and most suggestive for any craft worker. For the teacher in school shops there are many useful suggestions for problems, designs, methods, and finishes. In fact the second half of the book will be distinctly useful in the library of any craftsman.

Elements of Electricity

By W. H. Timbie. Cloth, 554 pages, illustrated. Price, $2.75, net. John Wiley & Sons, New York City.

This is the latest reissue of a text and reference book which has been the most popular in its field during the past fifteen years. The volume has been brought up to date in accordance with the newest electrical theory and practice. In form and method it is as splendid and fresh as it was when first published.

Automotive Electricity

By Earl L. Consoliver. Cloth, 605 pages, illustrated. Price, $4. McGraw-Hill Book Co., Inc., New York City.

This book outlines in thirty comprehensive sections the construction, operation, and maintenance of equipment for ignition, starting, and lighting of automobiles. It begins with a brief discussion of the principles of electricity and then develops in logical sequence the theory and practice of the electrical systems used most commonly in gasoline automobiles. The book is prepared in such a manner that the student not only learns principles, typical constructions, and operation, but also simultaneously is given the necessary information for the care, maintenance, and repair of the various types of devices. Special sections are devoted particularly to trouble shotting and to adjustments in which the most typical difficulties and routine work of caring for equipment are fully described. An appendix contains questions intended to test the student's understanding of theory and his practical knowledge of the best types of apparatus. The book will serve splendidly as a basic text in vocational schools or as a general garage reference book.

PUBLICATIONS RECEIVED

Report of the National Conference on Utilization of Forest Products. Miscellaneous Circular No. 39, November, 1924, issued by the U. S. Department of Agriculture, Washington, D. C. This pamphlet presents the results of a national movement to save timber and to eliminate waste by better methods of manufacture and use. It takes up the problem of waste in industry, utilization of little-used species of timber, reducing of lumber seasoning losses, small sawmill waste, utilization of lake states hardwoods, avoiding waste by dimension stock, and better utilization of lumber in buildings.

Occupational Efficiency of the Mentally Defective. Educational Monograph No. 7, College of Education, University of Minnesota. Prepared by G. C. Hanna. Gives the results of a survey of the inmates of the Minnesota school for feeble-minded and the colony for epileptics at Faribault. The report offers an analysis of results of occupational tasks and of an experiment in cooking and sewing, basketry, rug weaving, hand weaving, rope braiding, brush making, net making, chair caning, shoe repairing, dairy work, and printing.

Printing as a Subject in the Schools. By Merritt W. Haynes. Issued by the American Type Founders Co., Jersey City, N. J. A beautifully designed and well printed pamphlet treating the subject of printing from the standpoint of the printing industry, as well as the standpoint of the educator. The pamphlet gives suggestions for the selection of an adequate printing outfit for schools and outlines the objectives to be sought in offering printing in various types of schools.

Reporting Educational Research. Bulletin No. 25, 1925. Price, 50 cents. By W. S. Monroe and Neil B. Johnston. Issued by the University of Illinois, Urbana. The pamphlet has been issued as a means of assisting the investigator in reporting on educational research work. It discusses the criteria for judging educational writings, describes the process of writing a report, and gives general directions for the preparation of the manuscript for the printer.

What Are You Going To Do? An eleven-page pamphlet, issued and produced by the printing department of the Worcester Boys' Trade School, Worcester, Mass. The material was compiled by the Los Angeles, California, employing printers, and discusses the necessity for regular employment on the part of the boy and the exceptional advantages to be gained in the printing trade. It is a fine example of the excellent work accomplished by the printing department of the Worcester Trade School.

List of Graduates and Honor Roll, 1913-1922, Worcester Boys' Trade School, Worcester, Mass. The book is a record showing the character of the work performed by the graduates of the school.

Establish Saw Service Stations. The Simonds Saw and Steel Company has established thirteen service stations and repair factories in which users of Simonds saws and knives may receive expert repair service. In each of the thirteen stations, new saws and planer knives are carried in stock, so that schools and woodworking establishments which require prompt replacements can obtain new saws and knives.

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TRADE PUBLICATIONS

Keuffel & Esser Issue 1925 Catalog. The Keuffel-Esser Co., of New York City, has just issued a new price list applying to its 1925 catalog of drawing equipment and supplies. The present price list which is in its 36th edition, is for all the firm's branches with the exception of San Francisco and Montreal, Canada. Among the articles listed are drawing and cross-section papers, drawing instruments, slide rules, compasses, barometers, hand level, leveling rods, field glasses, and magnifying glasses.

Linoleum Block-Printing by Frank K. Phillips and John E. Williams, has just been published by the Linoleum-Block Printing Supply Company of Jersey City, N. J. It is a very useful booklet, describing the technical processes of engraving and printing linoleum-blocks. It includes an article on the "Value of Color Printing in Art Instruction," and contains some beautiful illustrations in four and five colors made by students.

Drawing Instruments and Materials for High and Preparatory Schools, and Manual Training Schools. Edition of 1924. Paper, 52 pages. Issued by Keuffel & Esser Co., New York City, and Hoboken, N. J. This booklet which is supplemental to the general catalog of the firm, describes mathematical instruments, drawing tools and materials marketed for the use of public schools and preparatory schools. It lists various types of drawing materials and tools, and describes accurately each item listed. Among the tools listed are triangles, irregular curves, t-squares, pantographs, compasses, triangular scales, and drawing instruments. A separate price list is appended for the benefit of the schoolman or shop teacher.

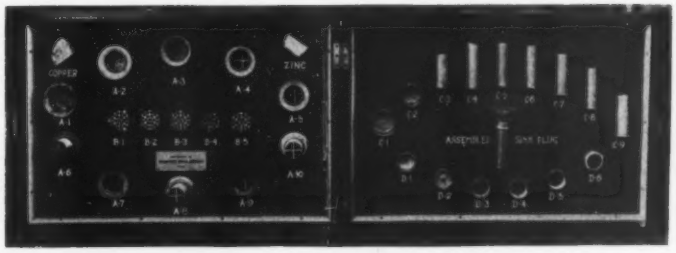
The Beauty of Gumwood. The Gumwood Service Bureau of the Hardwood Manufacturers' Institute, Memphis, Tenn., has issued a beautifully illustrated pamphlet showing the typical finishes of Red Gum as applied to furniture and interior woodwork. The pamphlet will be found valuable in connection with related work in elementary and advanced cabinet making.

Every Day Art. The May issue of Every Day Art, an interesting monthly, published by the American Crayon Company, in the interest of American art instruction, contains a valuable paper on the Monogram by Otto F. Ege, and another useful paper on the teaching of Perspective by Miss Mabel E. Rowe, Ridgewood, N. J.

Manufacturing a Sink Drain Plug. The Bridgeport Brass Co., of Bridgeport, Conn., recently exhibited a process display of a sink drain plug. The exhibit is used as a part of the instructional course in the Bridgeport public schools, and shows the fabrication of a kitchen drain plug from the raw material to the final finished product.

The exhibit travels from room to room in the school building, and the supervisor of science is generally present to aid the teacher as far as possible. The material is shown, the processes described, and the class is free to ask questions about the methods or materials employed. A brief talk is usually given on the brass industry and the part it plays in every-day life.

The box housing the exhibit contains a brass-covered notebook in which is enclosed a brief description of the various operations. It also offers an example of the kind of sheet brass used in making the exhibit.



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